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THE IRON AGE

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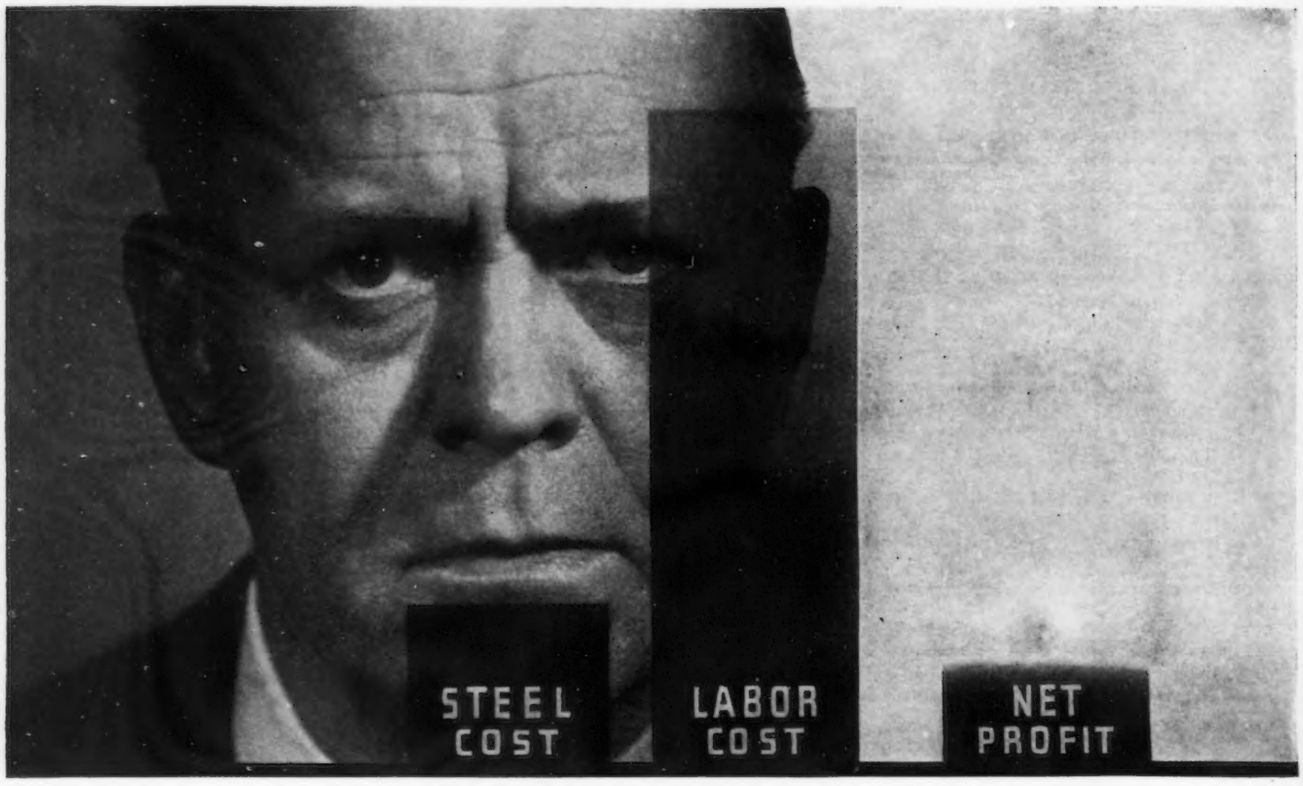

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▲▲▲ THE IRON AGE ▲▲▲

MAY 11, 1939

ESTABLISHED 1855 Vol. 143, No. 19

How to Help Win a War

FOLLOWING is an extract from page 593 of "The Budget of the United States for the Fiscal Year Beginning July, 1939, and Ending June, 1940:"

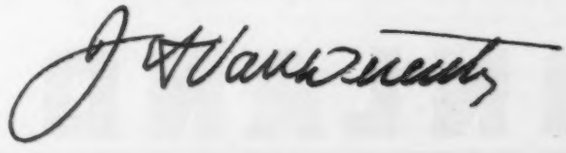
> "No part of the appropriations made in this act shall be available for the salary or pay of any officer, manager, superintendent, foreman or other person or persons having charge of the work of any employee of the United States Government while making or causing to be made with a stop watch or other time measuring device a time study of any job of any such employee between the starting and completion thereof, or of the movements of any such employee while engaged in such work*****"

No doubt, since so much emphasis is being put on war preparedness, this was kept in mind in formulating these budget restrictions, which therefore are intended to help win a war if necessary. And, of course, we know that the matter of industrial preparedness is supposed to be quite vital for war winning.

What applies to men behind the lines should apply equally well to those in front lines in such matters as military effort and discipline. Therefore, as a step toward winning the next war we suggest that an item such as follows be included in any future war appropriation:

> "No enlisted soldier in the United States Army, in time of war, shall be required to fire more than three shots at an enemy or take more than three pokes at him with a bayonet in any one working day. Said working day shall be restricted to six hours with no overtime and the working week of soldiers in active service shall be 30 hours. Double or quick time is prohibited on marches and there shall be no regulatory supervision of the movements of soldier employees of the United States either in drill or action."

We recommend this suggestion to the attention of those legislators who were responsible for the budget restriction quoted in our opening paragraph. It would help win a war—help the other fellow win it!



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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Falk installs MODERN TOOL CRIB CONTROL

o o o

By ROBERT BINGHAM
Western Editor, The Iron Age

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■ ■ ■

FOR many years in most industrial plants, the easiest way for a man to kill time has been to decide he needs a new drill, or to brake a tap, or to think mistakenly that another gage is necessary in addition to the one he already has. He then strolls leisurely to the tool room window, where the game of time killing begins, usually in company with half-dozen or more of his fellow-workers, who also are wise to this on-company-time rest haven. Lately, however, alert and progressive companies have recognized the inevitable delay and confusion resulting from old-fashioned control of tool cribs, and have installed modern systems.

One such company is the Falk Corp., Milwaukee, makers of speed reducers, gears, flexible couplings, large marine turbine and diesel engine drives, etc. To use the words of Paul S. Knowles, production engineer at Falk, who was in charge of the tool room improvement project, the chief reason behind this company's desire to set up a modern system of control was a "sloppy appearing, crowded tool room, with too many men waiting to be served and a sense of confusion existing throughout." In addition, inventory frequently was unbalanced, checks were lost and confused, no exact inventory was maintained, no records of tools available were kept, tool authority was not centralized, and the tool purchasing program was inefficient and wasteful.

It must be stated at the outset, that the above condemning statements are not applicable only to Falk before its tool room was improved, but to all tool cribs in all plants where no unified, controlled plan is followed. The most common old style system is the brass check plan, which was in use at Falk before the renaissance.

The first step in the modernization was to clean out the old tool room, and a general check-up was made to remove all obsolete and unusable tools. The shop canteen which had been operated along with the tool room was removed to a shop store open only at certain hours during each shift. Jigs and fixtures rated a separate department also.

It was decided to make use of a tool system devised by the McCaskey Register Co., Alliance, Ohio, so the necessary control equipment under this scheme was purchased. In addition to existing facilities, two Lyon Metal Products Co. special storage bins, 15 ft. long x 15 in. deep x 75 in. high, back to back, were purchased also and permanently placed, space thus being provided for rearrangement. Mr. Knowles points out the convenience of having an empty bin available. Moves can then be made rapidly and are accompanied by a minimum of confusion. All tools were rearranged with regard to type, accessibility to window, and other factors. Placing of grinders and other equipment was arranged to give maximum space, since the repair work is incorporated within the enclosure of the crib proper.

After the physical work of rearranging was completed and a recheck made to see that tools were all logically placed as to sequence of size and type, the crib was allowed to run a few weeks with the new arrangement so as to obtain familiarity and uncover any weaknesses or new ideas. Some tools were found to be unnecessary at this time and were removed.

All bins were numbered vertically beginning in the lower left hand corner in increments of 50 for each shelf. Shelves were considered as 4½ in. apart, this being as close as they can be placed conveniently. The lowest shelf, for example, was numbered 8000, the next 8050, etc., for the 8000 section.

A 3-ft. bin opening cannot practically be separated into more than 15 divisions, hence one section carrying a number such as 8000 may consist of as many as three bins. Shelves vertically may be spaced on any multiple of 4½ in. without disturbing the numbering setup. Shelves may be added

or removed at will and numbers are always available. At Falk, 15 numbers are allowed horizontally for one 3-ft. wide bin, a section three bins wide being numbered up to 50.

The numbering was started in one corner and proceeded in order throughout the crib. Sections were blocked out and numbered by thousands first and then the bins comprising each section were numbered shelf by shelf for each tool in the crib. Tool numbers in four digits immediately indicate the bin location and the proper position of the tool in the bin. As an example, tool No. 8054 is in the 8000 section in the first bin on the second shelf from the bottom, and in the fourth shelf division from the left. This system of numbering is flexible in every way.

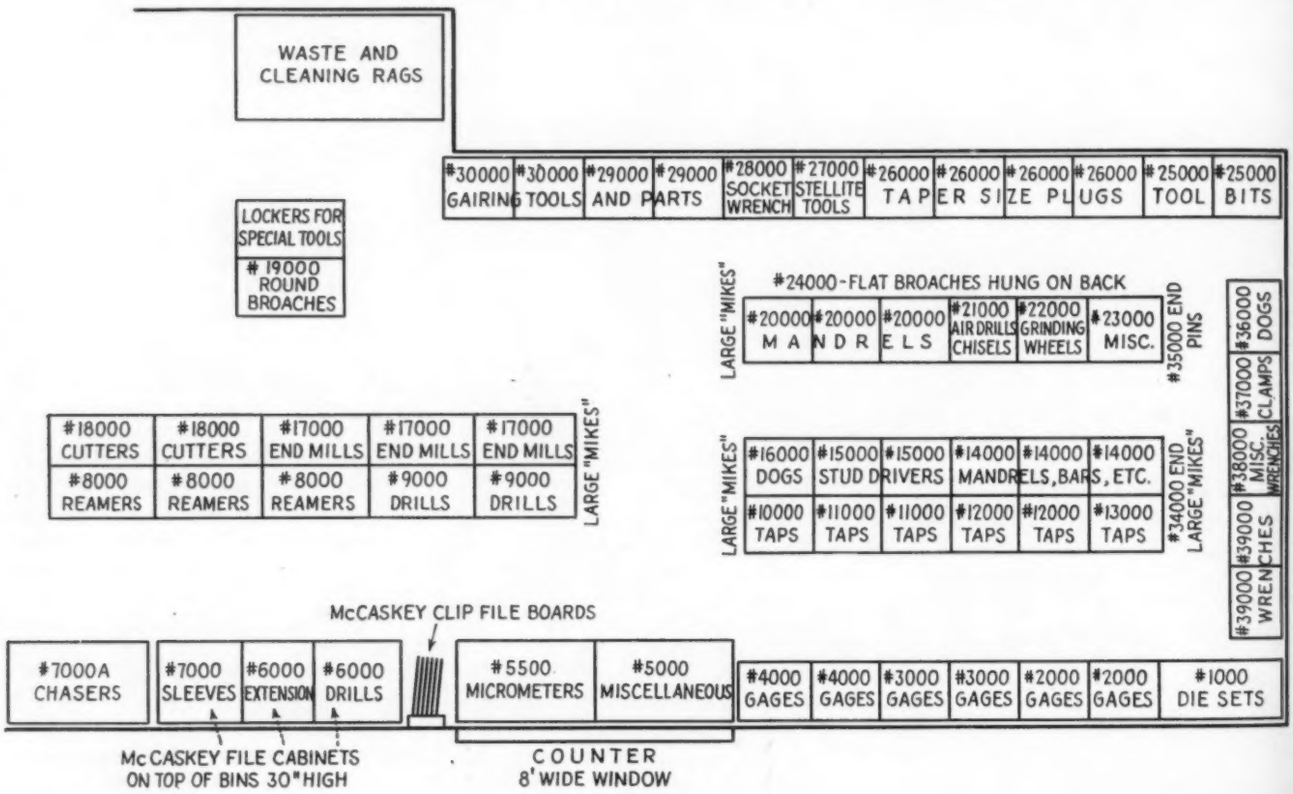
Other preliminary work included the making out of tool activity control sheets consisting of all tools listed alphabetically for easy reference. Mr. Knowles considers this the most important work sheet in the entire set-up. Inventory cards were made out and placed in the McCaskey register cabinets. Falk does not use these actually for inventory, but as a division point to separate pink tool slips denoting tools out and returned. Inventory cards are card indexed at the foreman's desk and are entirely under his jurisdiction. This is the only major departure from the McCaskey set-up. Sheets were made out for the attendant to list the monthly turnover for each tool. When these data are complete, the sheets are referred to the production department where the entries are transferred to the tool turnover report.

The methods of tool withdrawal, forms used for tool slips, broken tool reports, cabinets, filing systems, etc., were adopted directly from the McCaskey plan. A full description of the McCaskey system will not be found in this article, as details are readily available from the McCaskey Register Co. and have been published elsewhere many times. Our purpose is merely to point out what one company has been able to accomplish by the use of this tool crib control scheme.

Briefly, however, the mechanics consist of the use of triplicate tool withdrawal slips, one to be kept by the man as his record of responsibility, a second is charged against the tool, and the third is charged against the man. When tools are broken, reports are made out and turned in with the tool to the tool room foreman, who checks the tool for scrap or salvage and makes his deduction from his inventory record. The crib foreman has final authority at Falk as to disposition of broken tools and requisitioning to production department for replacement.

All of the necessary material was purchased and installed before the system began, so that those concerned could familiarize themselves with the equipment. The installation was a big job, Mr. Knowles said, but was worth the time and effort. "For best results," he said, "the original planning cannot be too detailed and accurate. The more carefully all the preliminary work is done, the smoother the finished machine will run when started. From what I have seen of many tool rooms attempting to run with control systems, I find most failures or partly efficient setups are due to incomplete planning and lack of careful attention to preliminary detail."

The opening date for the new system to go into operation at Falk was set for May 2, 1938. Notices were posted prominently and all foremen were instructed to turn in all perishable tools, wrenches, drills, taps, indicators, gages and the like on April 29, Friday. Because of the great confusion which would have resulted from trying to clear all outstanding tool checks, tools were just dumped on the crib window with no sorting at all. According to Mr. Knowles, "The quantity and variety of tools turned in was enormous. It was a revelation to see what the men had



collected over the years. Tools long since regarded as lost were returned. A low estimate of the number would be 2500 to 3500 tools." All Saturday and Sunday crib attendants worked placing tools in the proper bins, sorting out worn and broken tools, and preparing generally for Monday morning, at which time the crib opened on schedule.

Falk now has a well planned tool room, with every advantage being taken of space, so that the attendant will have no unnecessary steps or wasted time. All tools are indexed, numbered and well binned with no crowding, and room for future expansion has been allowed, both as to quantity and type of tools.

AT LEFT

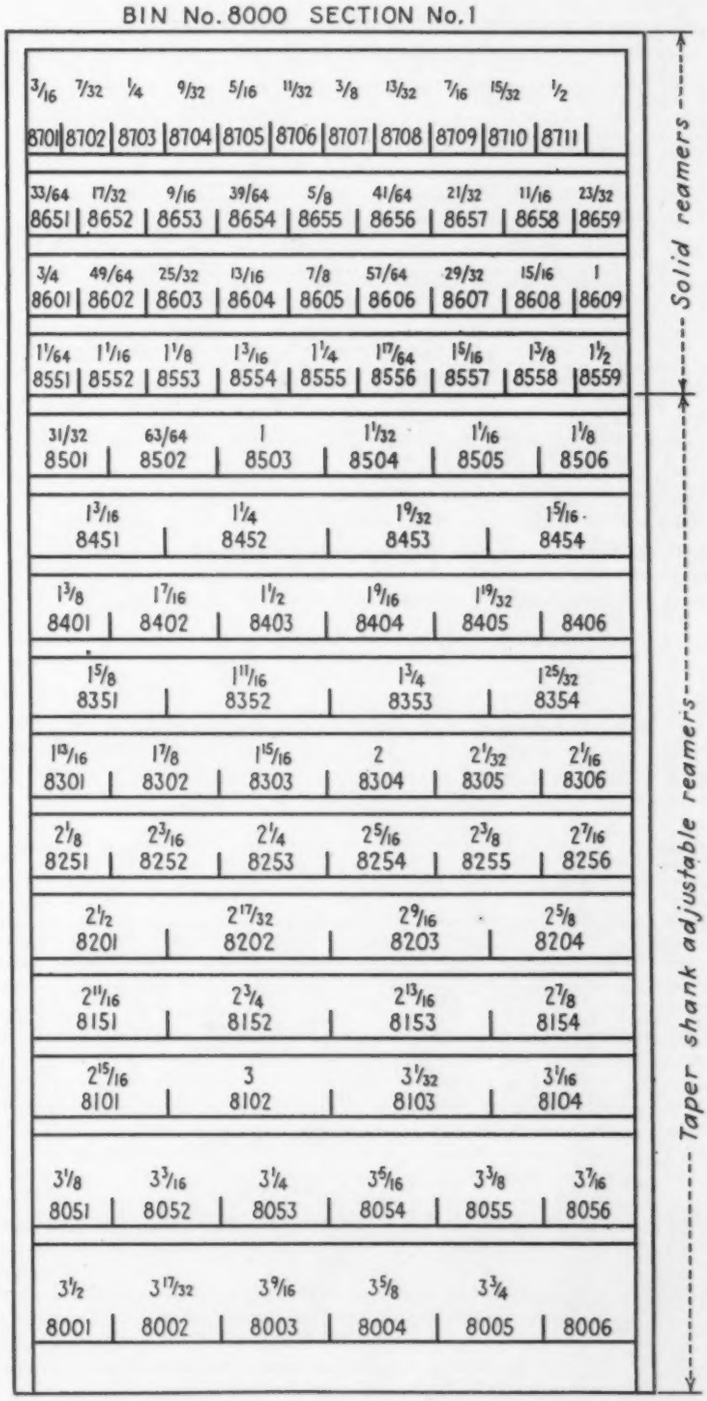
GENERAL layout of the revised crib layout in the tool room of the Falk Corp., showing general method of numbering bins and contents thereof. This view shows the storage section only.

AT RIGHT

BIN maps were made of each bin after tool numbering and arrangement had been completed. These charts are kept in hands of tool supervisor or in production department for ready reference. They serve as an easy means of making the initial inventory. Entries are made directly on the chart in colored pencil. Cross reference to any other chart is a simple procedure.

To obtain the above results in its tool room, Falk considers the cost rather high. Mr. Knowles said, "Including all equipment, bins, etc., this cost was about $4000. This was more than justified, as correct and simple layout, as neatly arranged as possible, makes other handicaps easier. The morale in the crib grew and a real pride in the crib created a real interest in the job at hand. I cannot too strongly emphasize the necessity of scientifically working out the details of arrangement. Check lighting systems carefully and provide necessary lighting. Be sure that crib is adequately closed and locked. A very durable matting, made of rug fiber impregnated with rubber, solved the floor problem. Its resiliency and comfort added much to the comfort of the attendants. This product is made by the Bickett Rubber Co., of Watertown, Wis., and I highly recommend its use in a tool room, or at machines where oil is not too prevalent. Generally speaking, a tool room foreman has excellent ideas as to what he wants or needs. He will do much to put a control system across when he sees you are willing to cooperate with him and his men. To gain his full confidence and support will win half the battle."

A balanced inventory is now available at this tool room where none existed before. The broken tool report procedure places the responsibility for quantity of tools directly in the hands of the tool room foreman. When he files his copy of the report, he sends



MONTHLY TOOL TURNOVER REPORT 1938-1939

TOOL No.	DESCRIPTION OF TOOL	PRESENT INVENTORY	PRICE NET	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MINIMUM STOCK
	H.S.S. Taper Shank Drills	10/15/38														SET 12/15/38
9721	17/64	20	.71	60	52	25	33	42	39	47						12
9651	9/32	9	.71	21	17	22	12	18	21	14						6
9652	19/64	6	.76	18	4	3	10	9	3	9						6
9653	5/16	8	.76	77	71	60	84	74	73	83						9
9654	21/64	9	.81	9	23	8	10	10	10	15						6
9655	11/32	11	.81	28	39	37	26	30	27	25						6
9656	23/64	8	.90	15	18	9	17	19	25	12						6
9666	3/8	12	.90	61	55	50	54	44	36	41						9
9667	25/64	8	1.00	8	5	14	11	18	14	13						6
9668	13/32	9	1.00	33	35	33	62	32	41	30						6
9669	27/64	13	1.09	96	74	59	71	71	69	88						12
9670	7/16	21	1.09	52	61	52	67	63	44	54						12
9671	29/64	14	1.19	3	6	3	6	2	2	7						4
9601	15/32	11	1.19	41	36	31	36	32	50	52						9

THE monthly tool turnover report, made out for each class of tool in alphabetical order, is considered one of the most important work sheets in the set-up. The figures show the number of times an individual tool was withdrawn from the crib during any particular month. Minimum stock is determined from these histories.

o o o

STANDARD tool sheets similar to this one were created for the engineering department. Attempts are made at all times to adjust shop needs to tools listed on these sheets. In this way standardization is achieved and accumulation of miscellaneous special tools is avoided.

o o o

	TOOL NUMBER	DESCRIPTION OF TOOL	MANUFACTURER	SERIAL NUMBER	DIS.	PRICE	ALTERNATE MANUFACTURER	SERIAL NUMBER	DIS.	PRICE	MIN. STOCK
		Standard Hand Reamers									
		Spiral Fluted- Carbon Steel									
	8716	1/4	Cleveland Twist	Type 128C	25%	1.70					
	8717	5/16	Drill Co.			1.80					
	8718	3/8				1.90					
	8719	7/16				2.10					
	8720	1/2				2.30					
	8721	9/16	J. Pritzlaff Hdwe.			2.40					
	8722	5/8				2.65					
	8723	11/16	Marquette			2.90					
	8724	3/4	1965			3.10					
	8725	25/32				3.35					
	8726	13/16				3.35					
	8727	7/8				3.70					
	8666	15/16				4.10					
	8667	1				4.45					
	8668	1 1/8				5.15					
	8669	1 1/4				5.90					
	8670	1 5/16				6.25					
	8671	1 3/8				6.70					
	8616	1 1/2				7.70					
	8617	1 9/16	Special Price on application								
	8618	1 5/8	" " " "								
	8619	1 3/4	" " " "								
	8620	1 15/16	" " " "								
	8621	2	" " " "								

the other to the production department indicating replacement when required. The production department therefore is daily informed of breakage.

After eight months operation the tool activity control sheets were used to set minimum quantities of tools to be carried. These were determined by consulting the tool room foreman and his file of inventory cards. Reference to the number of times a month a tool was drawn, and the foreman's knowledge of the number required to permit flexibility in grinding, enabled him to set a reasonable number to have on hand. This resulted in a reduced inventory. Gearing tools were cut from $4228 to $2239, drills were cut from $9000 to $7000, facing bars from $4080 to about $1500, chasers from $6000 to $3500, and end mills from $2800 to $1600. These items indicate the general trend, which cannot be entirely brought out because the full evaluation of tools and the value of inventory reduction has not yet been completed.

Perpetual Inventory Available

A perpetual inventory is always obtainable through a perusal of the pink slips, since those placed ahead of the inventory card in the compartment represent tools out. A check can thus be instantly made of the number of tools existing at any time. It is always known who has the tools which are out, and it can be readily determined how long any tool has been in one man's hands.

Falk holds the tool room foreman fully responsible for the complete care, condition and quantity of tools. He is backed at all times by the production department, which must be consulted before he can change records, layout, tool numbers or minimums. The production department with its records can at all times check him on any items or requirements, and can, and does, check his minimums against tool movements and inform him to raise or lower these limits to suit working conditions.

Closer Control Achieved

Some significant comparable figures have resulted from this close working arrangement. Quoting Mr. Knowles again, "Machine shop payroll, taxes, insurance and other overhead averaged to constitute a means of comparison with figures comparable on several operations, show that these items in 1938 were about 70 per cent of 1937. The perishable tool purchases in 1938 were 42 per cent of 1937. This result was accomplished in eight months of control. During this period, purchases were cut down, as we were using up tools to reach a minimum throughout the period. Since this resulted in a dollar saving in excess of $50,000 for tools and supplies, it can be seen that the effect was well worth while. Purchases in 1937 were $132,000 as against $55,000 in 1938."

Tool standardization was suggested by the setting of minimums on the basis of tool movements. Accordingly, based on turnover reports and inventory, standard tool sheets were created for the engineering department. In most cases special tools were and are adjusted to meet the standards, and the production department must be consulted for information on special tools not shown on the standard tool sheets.

Standardization of tool purchasing is another result, as is the establishment of a tool budget by means of an arrangement with the cost department. This arrangement merely includes the furnishing by the cost department of a summary of tool purchases during the month, and the provision by the production department of a cost record of broken and worn tools scrapped during the month. Thus the asset value of perishable tools carried on the company books is kept balanced, and since a standard to go by is available, the setting of a budget is permitted.

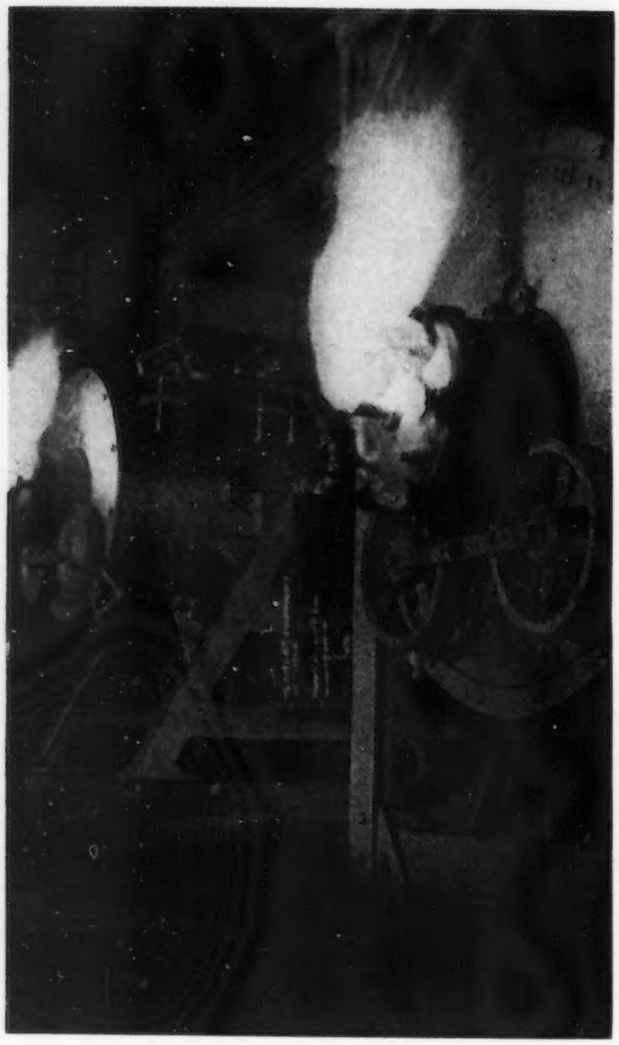
One of the miscellaneous benefits resulting is the ability to determine which tools are needed continually on certain work. On these jobs the men are allowed to keep the tools in their possession and are charged with them directly.

When a man leaves the company, or if the company wishes a check on a certain man, his record with the crib is easily checked. The value of those tools for which he cannot properly account is deducted from his pay check.

In cases where departments use certain tools day after day, the foreman is held responsible and allotted cabinets provided with lock and key for storage. Under this arrangement, about 1000 micrometer transactions a month have been eliminated. Thus far, Mr. Knowles says, no foreman has lost a tool charged to him in this manner.

Standard Job Tooling

The final step, now only in the preliminary stages, is standard job tooling. "By this process," Mr. Knowles said, "we hope to combine the tools required on a standard machined part by drawing number. A file record of such standard tooling in the tool crib will permit a man to draw all tools required on a standard operation on one slip. This tooling number can be placed in advance on the work card, and the man can obtain the tools required before he receives the drawing of the job. This will materially reduce the filing work in the crib and the number of slips to be made out by the man. If this can be achieved, we feel we have as nearly perfect an answer as is possible."



ROTARY-RETORT gas carburizer in operation in the plant of the Cleveland Tractor Co.

Carburizing

ON the subject of selection of the case depth to be used, it might first be mentioned that the depth of penetration of carbon may be anything up to the available metal section, of course, if sufficient time and active carburizing agent is provided. However, a glance at Fig. 2 (see first section, THE IRON AGE, May 4, page 36) will show that the time required is considerably lengthened when high penetrations are sought. Consequently, the majority of work is case-hardened to depths of 1/16 in. or less, and rarely indeed is more than 1/8 in. desired.

Several factors must be considered in selecting the case depth limits, and the choice of steel to be used must concurrently be made. Probably the best starting point is to decide what the probable type of ultimate failure will or should be. If failure will in the end be due to abrasion, then the second point is what wear loss will force replacement. For example, if a given piece will no longer function usefully when worn 0.010 in., then obviously there is little value to a case much deeper. If, on the other hand, the part will be serviceable as long as there is any hard surface left, then an economical balance must be struck between original cost of deep case and replacement cost.

Examples of purely abrasive failure are infrequent. Usually large mechanical loads occur simultaneously, and the embrittling effect (due to reduced tough core) of deep cases must be considered, as well as the probable failure of the piece by bending or shear after abrasion has considerably reduced the metal section. The rule thus is to be summarized as follows: Use the least case depth which will insure required original properties and a reasonable, competitive service life.

When the mechanical loads encountered are severe and dominate selection of case depth, a careful analysis must be made of the nature and intensity of the stresses. Simple shear or bearing loads are ordinarily easily calculated, and the case required is nominal. When alternating compressive or bending stresses obtain, as typically in gears, sufficient case must be provided that the resistance at the surface and, as well, at any point below the surface is greater than the stress intensity. In other words, the high endurance limit of the hardened case must continue inwardly until the lower endurance limit of the core material is sufficient to exceed the demands at any sub-surface point. In bending, the stress increases from zero at the neutral axis to a maximum at the surface, while the resistance of the core is constant. If the latter be exceeded, sub-surface failure will result. "Spalling case" in service is frequently due to this action.

The harmful effect of notches, scratches, and similar stress raisers hardly needs to be pointed out, but it must be remembered that such effects are intensified in hardened steels, and carburized parts are more easily damaged than softer steels. All theoretical considerations, as in the paragraph above, may be nullified by poor design or machining.

An important factor to be borne in mind is the possible reduction of the hardened case by grinding after carburizing. Obviously, sufficient case must be provided to permit the necessary grinding—for finish or to correct warpage—that the final product still has the desired case depth and surface

Today

By GORDON T. WILLIAMS
Chief Metallurgist, Cleveland Tractor Co.

METHODS, STEELS, TREATMENTS

IN this, the second section of a two-part article, the author deals with the selection of case depth for any particular application and the selection of types of steel for carburization. In the first section the carburizing procedure was described, along with the various techniques used and results obtained.

hardness. Contrarily, it may be noted that increase of case often produces increased warpage, so that this method of attack may be unsuccessful. The alternative is, of course, to reduce warpage by better hardening practice, change in steel type, or in hardening treatment. Mechanical quenching in dies or fixtures may permit the dual economy of shallower case and less grinding.

When, as is usually necessary, excessive brittleness must be avoided, the common rule is to leave at least one-third uncarburized, that is, the total case must not exceed two-thirds of the section at the thinnest point.

TYPICAL CASE DEPTHS: Very shallow cases, often less than 0.010 in., are used in two decidedly different groups of parts. First — washers, small tools, and similar parts when resistance to scoring or indentation is needed, but loads and wear are moderate. The second class of work given shallow cases includes heavily loaded automobile gears; of these, an ever-increasing proportion is being gas carburized during the hardening treatment, a steel of fair hardening qualities being used, so that the case simply improves the wear resistance, while the core has sufficient mechanical properties to withstand the expected loading. No extensive grinding can be permitted with such shallow cases.

Case depths around 0.030 to 0.060 in. are very commonly used for moderately loaded parts such as gears and shafts; also for washers, gages, etc., which must be ground for finish, but are not to be heavily loaded in service. The range of 0.035 to 0.055 in. might well be called the standard case depth, so frequently is it used. An important reason for selection of this range is seen on examining Fig. 2; at 1700 deg., the usual carburizing temperature, about 6 hr. is required to give this penetration. Consequently, a fair opportunity is given for all pieces in a mixed charge to come to heat and achieve a fair uniformity of carburizing, with reasonable assurance that none will be below 0.035 in. and none far above 0.050 in.

Case depths between 0.060 in. and 0.075 in. are usually specified only when severe abrasion is expected, and good wear-life is wanted, or on heavy-duty gears such as in truck or tractor final drives, where stresses are very severe.

Case depths above 0.075 in. are rarely required except for long wear-life in abrasive conditions and for such special applications as hard-surfaced steel plate for armor or safes.

Selection of Steel

As already indicated, choosing the steel to be used for a given case-hardened part is closely tied in with carburizing method, case depth, and hardening treatment, and all these factors must be simultaneously considered.

A very wide range of steels is available and useful. Nearly every problem will have several possible solutions and economic or manufacturing considerations will govern final decision.

CARBON STEELS will ordinarily be preferred, because of cost, when the distortion following water-quenching can be tolerated. Core carbon content of 0.10 to 0.25 is customary, the lower range preferred for thin parts. Since carbon steels are shallow hardening, little can be done toward improved core properties by carbon alone. The low manganese plain carbon steels tend toward non-uniform hardening, and the higher manganese range (such as SAE X-1020) is preferably employed. Note that plain carbon steels can be hardened just as hard as, or harder than, alloy steels (the same as with carbon tool steels), and thus, when abrasion only is encountered, alloy steels may offer either no advantage or some disadvantages. A small percentage of chromium, or manganese up to 1.5 per cent, may be called for to improve the hardening or core properties of the carbon steels, but water quenching will still be used.

COMMON ALLOY STEELS: When the physical properties required in the core are higher than those given by carbon steels, or, particularly when oil quenching must be used to minimize distortion, one of the many alloy steels

containing up to 2 per cent total alloying elements will be selected. There are several possible choices here: The physical properties and working qualities of the SAE 3100, 4100, 4600, 5100, and 6100 steels are quite similar, differences due to design or manufacturing difficulties dominating the choice. It will be noted that all the above steels contain either chromium or molybdenum or both; these elements are of greatest value in case-hardened parts due to their ability to give a hard case and good depth-hardening, while nickel may be used in combination to improve toughness of case and core. A special type of steel coming into widening use contains only molybdenum as alloying element but is specially made to give controlled hardenability; carbon content is usually somewhat higher than in the preceding steels to give desired core properties. There is an increasing use of higher core carbon content with resultant higher physical properties in steels of this group, the case depth being decreased somewhat. Easier machining and lower carburizing time give improved economy.

By selection of suitable hardening treatment (usually direct quenching), good case and core properties plus low distortion may be had with these steels.

HIGHLY ALLOYED STEELS: In most instances the expected service requirements can be met most economically by one of the simple alloy steels, but occasionally it is necessary to use such a steel as S.A.E. 3312, 2515, or 4815, containing 3 to 5 per cent alloys. Excellent core physical properties can be attained with these, but their high cost, as well as the more elaborate heat treatment often required, rule them out normally. Further, retention of austenite in the hardened case is damaging in certain kinds of service, especially when heavy rolling loads are carried; the more simple alloy steels may retain considerable austenite after some treatments, and these higher alloy types are very prone to such behavior.

GRAIN SIZE, or, better, resistance to grain growth at the carburizing temperature, is usually specified in modern practice. The coarser-grained steels harden better, have lower toughness, and tend to distort more; the fine-grained are more tough, less readily hardenable, and show less distortion[1]. Since steel producers generally offer choice of grain-size range at little or no increase in price, it is usually wise to take advantage of this by specifying either coarse or fine-grain (McQuaid-Ehn test) as indicated by the requirements.

SELECTION OF HARDENING TREATMENT: Again the other factors already mentioned must be borne in mind when selecting the heat treatment to be used to harden the carburized case. Fig. 4 summarizes the standard heat treatments graphically and lists the principle features of each treatment, while Table I lists the standard carburizing steels with their critical points and the preferable heat treatments.

Before discussing details of these hardening processes, it must be emphasized that a prime factor in reducing distortion in case-hardening is a preliminary annealing of the pieces either before or during machining to a temperature higher than will be used in subsequent treatment, i.e. in carburizing. Since the latter is usually performed at 1650 deg. to 1700 deg., an annealing temperature of 1750 deg. is customary. Sometimes steels are selected which will coarsen in grain size at, say, 1750 to 1800 deg. and the annealing is carried on high enough to cause this grain growth; machining is facilitated, and later, reheating to a lower temperature restores the fine grain size. In any event, internal stresses must be relieved by annealing or severe and irregular distortion may occur in later treatment.

DIRECT QUENCHING FROM CARBURIZING is the most widely preferred hardening treatment (E, Fig. 4) for the low alloy steels; oil quenching is customary. This treatment prevents formation of the carbide network found in a slow-cooled hypereutectoid zone, thus avoiding a major cause of case brittleness. If fine grain steels are used, direct quenching will give minimum distortion. If the steel used has much tendency to retain austenite, this treatment aggravates the condi-

TABLE I

Standard Carburizing Steels and Heat Treatment Characteristics (Metals Handbook, 1939)

S.A.E. Steels*	Alloys	Critical Points Case Ac_1, Deg. F.	Critical Points Core† Ac_3, Deg. F.	Preferred Treatments, See Fig. 4	Quenching Medium	Tendency to Retain Austenite
1015	None	1360	1605	A,D	water or 5 per cent NaOH solution	Slight
1315	Mn 1½ per cent	1345	1520	A,D	solution	Slight
2315	Ni 3½ per cent	1300	1440	C,D,F	oil	Moderate
2515	Ni 5 per cent	1250	1420	D,F	oil	Strong
3115	Ni 1¼, Cr ½ per cent	1355	1500	E,C	oil	Slight
3215	Ni 1¾, Cr 1 per cent	1350	1465	D,F	oil	Moderate
3312	Ni 3½, Cr 1½ per cent	1330	1435	D,F	oil or air	Strong**
3415	Ni 3, Cr ¾ per cent	1330	1425	D,F	oil	Strong**
4115	Cr 1, Mo ¼ per cent	1395	1500	E,C	oil	Strong**
4615	Ni 1¾, Mo ¼ per cent	1335	1485	E,C	oil	Slight
4815	Ni 3½, Mo ¼ per cent	1300	1440	E,F	oil	Moderate
5115	Cr 1 per cent	1410	1550	E,C	oil	Slight
6115	Cr 1, V 0.15 per cent	1420	1550	E,C	oil	Slight
Ni-Cr-Mo	Ni 1½, Cr ½, Mo ¼ per cent	1350	1475	E,C	oil	Moderate

*All steels preferably of grain size 5 or finer.

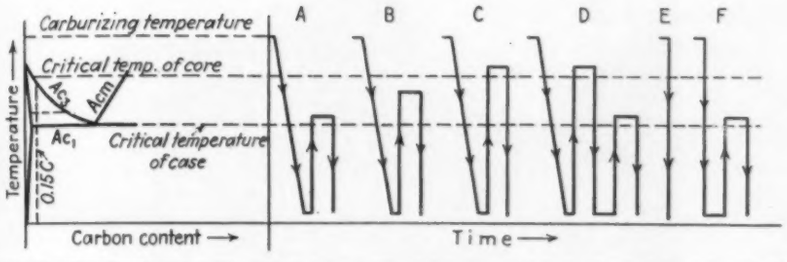
†Ac_3 of core will decrease as carbon is increased.

**Spheroidization of excess carbide by subcritical treatment may be used to decrease austenite retention.

[1] See "What About Grain Size," by Carl Shapiro, THE IRON AGE, March 23, March 30, April 6, 1939.—Ed.

tion; either control of the maximum carbon content of the case (see gas carburizing above) or a lower hardening temperature must be used. The core is hardened to the maximum.

Direct quenching may be followed by requenching from a temperature just above the critical point of the case (F, Fig 4); better toughness of the core, better hardness of the case, and somewhat more distortion follow.



Treatment	Case	Core
A Best adapted to fine grained steels.	Refined; excess carbide not dissolved.	Unrefined; soft and machineable.
B Best adapted to fine grained steels.	Slightly coarsened; some solution of excess carbide.	Partially refined; stronger and tougher than (A).
C Best adapted to fine grained steels.	Somewhat coarsened; solution of excess carbide favored; austenite retention promoted in highly alloy steels.	Refined; maximum core strength and hardness. Better combination of strength and ductility than (B).
D Best treatment for coarse grained steels.	Refined; solution of excess carbide favored; austenite retention minimized.	Refined; soft and machineable; maximum toughness and resistance to impact.
E Adapted to fine grained steels only.	Unrefined with excess carbide dissolved; austenite retained; distortion minimized; file proof when carbon is high.	Unrefined but hardened.
F Adapted to fine grained steels only.	Refined; solution of excess carbide favored; austenite retention minimized.	Unrefined; fair toughness.

FIG. 4—Characteristics of usual hardening treatments. (Metals Handbook, 1939)

SLOW COOLING FROM CARBURIZING (A-D, Fig. 4) permits the excess carbide in the hypereutectoid zone to precipitate around the grain boundaries, and its resolution may be difficult; such a network leads to brittleness of the case. If work must be slowly cooled from carburizing, and the cementite network will be too undesirable, then the first hardening treatment must be at a sufficiently high temperature to permit re-solution of this carbide before quenching (C, D, Fig. 4). In many alloy steels solution is slow, so that a high temperature and considerable time must be allowed. Of course, if carbon content has been held near eutectoid by controlling carburizer activity, negligible excess carbide will be formed.

REHEATING FOR BOTH CASE AND CORE: If the heating temperature is high enough (C, Fig. 4), both case and core will be hardened, giving a strong but less ductile core, with a somewhat brittle, hard case. This treatment is widely used on slow-cooled parts because of the balance between maximum toughness and maximum strength or hardness; excess carbide may be fairly well removed from grain boundaries. As with any hardening treatment above the lowest possible temperature, austenite retention is promoted if the steel contains much alloy content.

REHEATING FOR CASE ONLY, is performed at a temperature just above the case critical point (A, Fig. 4), which is, of course, quite a bit below the core critical and the excess carbide solution temperature. Excellent case hardness follows quenching from this range, but case tends to be brittle unless a previous high quench, either direct from carburizing, or by reheating, has been given. With the latter treatment (D, Fig. 4), the time-honored "double quench," maximum toughness of core and hardness of case are achieved, but with sacrifice of core strength and with fairly large distortion.

TEMPERING: All case-hardened pieces have considerable internal stress due to the duplex nature of the material, and any but the crudest parts should be given a draw treatment at the maximum temperature which will not appreciably affect the surface hardness: usually 275 deg. to 350 deg. F. is most suitable. Particularly if the surface is to be ground, parts must be tempered to aid in avoiding grinding cracks; these are also more prone to occur if carbide as network is present.

CONCLUSIONS: Case hardening is easily performed with very satisfactory results. The various factors determining uniformity of results, i.e., time and temperature of actual carburizing, adequate supply of active carburizing agent of the desired type, and judicious selection of steel, case depth, and hardening procedure, must all be carefully controlled, but such control is not difficult.

Wire Galvanized By Marino Process

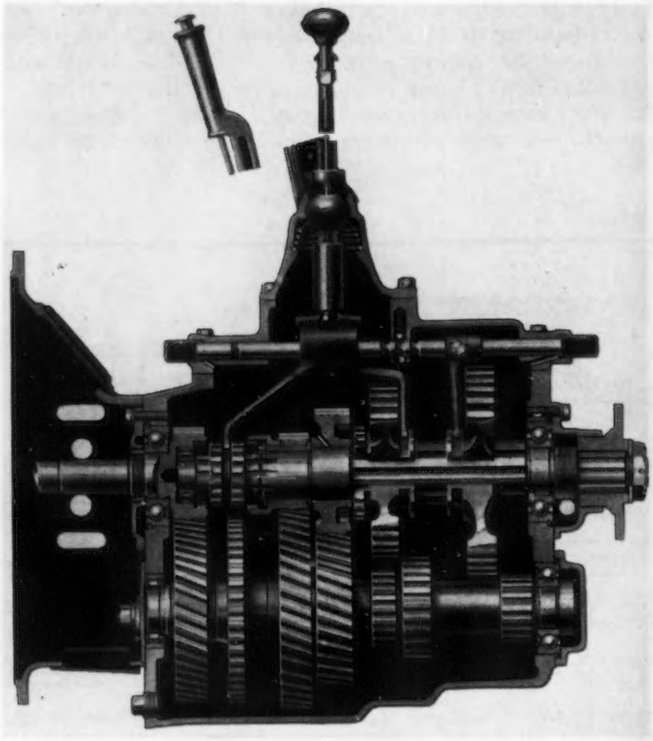
THE Marino galvanizing process which has had a five-year trial in England under mill production conditions, is being offered in the United States and Canada for license or sale through the office of George D. Hartley, consultant, 311 Main Street, Worcester, Mass. By this process many tons of wire have been produced in England for the trade in sizes ranging from ½-in. rods to the finest wires.

The machine incorporates electrocleaning, pickling and galvanizing in an entirely automatic process, and may be adapted to cover wires and shapes with tin, lead, copper, brass, nickel, cadmium, or other metals and alloys.

Production schedules are claimed to be 50 per cent faster than hot galvanizing, and production costs are claimed as being lower. This process is said to turn out a product passing rigid specifications, and one mill in England is currently turning out 50 tons of Marino galvanized high tensile wire weekly for British Government agencies.

SIMPLIFIED TOOLING . . .

FOR JOB LOT GEAR SET PRODUCTION



CUT-AWAY view of a typical Fuller transmission. This shows helical and spur gears. Some transmissions also incorporate herringbone gears.

FULLER transmissions are designed and built for truck and bus manufacturers and for the industrial field. The company also makes gears for special assemblies. Up to last year it featured a line of five-speed transmissions. It then added four- and eight-speed types. Despite the influx of new designs, the shop and engineering department continue to run smoothly. Employment is notable for its steadiness. There are no sharp peaks or valleys in the production curve. In spite of the fact that most customers release on a 30-day basis, actual production runs remarkably close to the sales department's estimate projected three months ahead.

To make this possible, Fuller has done three things: It has designed a series of transmissions which with simple gear changes can be altered to suit individual requirements; it has equipped itself with a highly flexible gear department, and it has developed a method of gear design and production that has eliminated the tooling headache.

As a matter of fact, all of the 300 sizes and types of active gears—and for that matter many of the rest of the 1400 gears—can be produced with but 15 sets of tools, including four sets of tools for herringbones and two spur cutters for close shoulder work.

Gears are designed to fit standard tools, standard cases, standard shafts. For instance, supposing some manufacturer desired a transmission with a certain set of ratios, all of which except perhaps the third-speed ratio would be covered by a standard Fuller model. In that case, a new set of third-speed gears—operating on the same center distances as the standard set—are worked out for the transmission, changing the number of teeth, tooth thickness, etc., to fit the requirement. These gears may not have—and probably will not have — standard pitches, but they are designed with true involutes and they can be produced with tooling already available. Often no change in gear blanks is necessary. Production is simplified, deliveries speeded up, and many special tooling costs eliminated. The gears may be unconventional — but they work perfectly.

To make such design flexibility possible, Fuller last year equipped its gear department with the most modern and flexible production equipment available. Basic steps in the production of gears consist of hobbing, or shaper cutting when shoulders are present, — shaving, grinding the o.d. precision boring the bushings, carburizing, lapping — and 100 per cent quiet test.

The hobbers, Fig. 1, are equipped for climb-hobbing. One of the standardized practices at Fuller, incidentally, is the shifting of each hob by ½ circular pitch for each 12 gears hobbed. This, together with climb-hobbing, is largely credited with an

increase in tool life of some 200 to 300 per cent or more.

From the hobbers or the shapers, gears go to the gear shavers, (Fig. 2), which are the rotary crossed-axis type. Alongside of each shaver is a grinder. The shaver finishes the gear teeth concentric with the arbor centers and the outside diameter is ground while still mounted on the shaver arbor. This assures that the o.d.'s are accurately concentric with the pitch circle. The operation is important since gears are later located from the o.d. in chucking for all subsequent hole grinding or boring operations, such as on the Heald Borematic, Fig. 4, for precision boring the bushings.

A further important requirement for accurate control of the o.d. is involved in the engineering design of the gears. When designing a new set of gears, each is checked by calculation to see that the crossed-axis shaver cutter will not hit the fillet at the root of the teeth left by the roughing tool and yet will cut deep enough so that the gear is shaved beyond the maximum entering depth of the mating gear. These are two principal engineering checks on all gear designs. If the design does not fall within this range, the gear design is altered or roughing operations are changed on the operation sheet to correct the condition before releasing the gear to the shop for production.

MANUFACTURE of 300 sizes and types of "active" gears—including gears for 79 standard transmissions—is being accomplished with only 15 sets of gear cutting tools by Fuller Mfg. Co., Kalamazoo, Mich. The company's record books show a total of 1400 gear designs, any of which the shop may be called upon to produce at any time without major tooling revisions.

Two per cent of all gears are sent to the checking department for lead and involute checking, Fig. 5. The Michigan involute checker, incidentally, is of special design, equipped to handle gears with shafts up to 26 in. between centers. The involute checker, furthermore, is equipped with a new style of finger in the shape of a rack tooth. The design is such as to eliminate the necessity of fine adjustments in locating the finger in relation to the base diameter. One angle of rack is used for both spur and helical gears regardless of pressure or helix angle.

Set-up time for the lead checker and the shaver (figured together) is roughly 30 to 45 min., depending on whether or not cutters are changed. Lead checking is handled by regular production workers. To simplify the operation, tables of Johansson block combinations for the sine-bar setting of the lead checker—for each size of gear—are provided in the checking room.

All Fuller gears are carburized to obtain maximum life under heavy loads. Subsequent lapping of gears is carried on in pairs, without reciprocation, on special machines, Fig. 6. These machines are built up from spur gear testing machines equipped with hydraulic brakes (oil pumps with restricting valves). An interesting feature is the handling of lapping abrasive. The amount of abrasive in circulation is relatively small. It is carried in a small funnel reservoir, drawn off from the bottom and fountained the full width of the gear, returning to the funnel. After each pair is lapped a small measure full of abrasive and oil (designed to equal the amount used) is added to the funnel tank. This method of control prevents sudden changes in the compound and assures consistent lapping,

o o o

FIG. 1—View of hobbing department of Fuller Mfg. Co. Machines are Barber-Colman type equipped for climb hobbing.

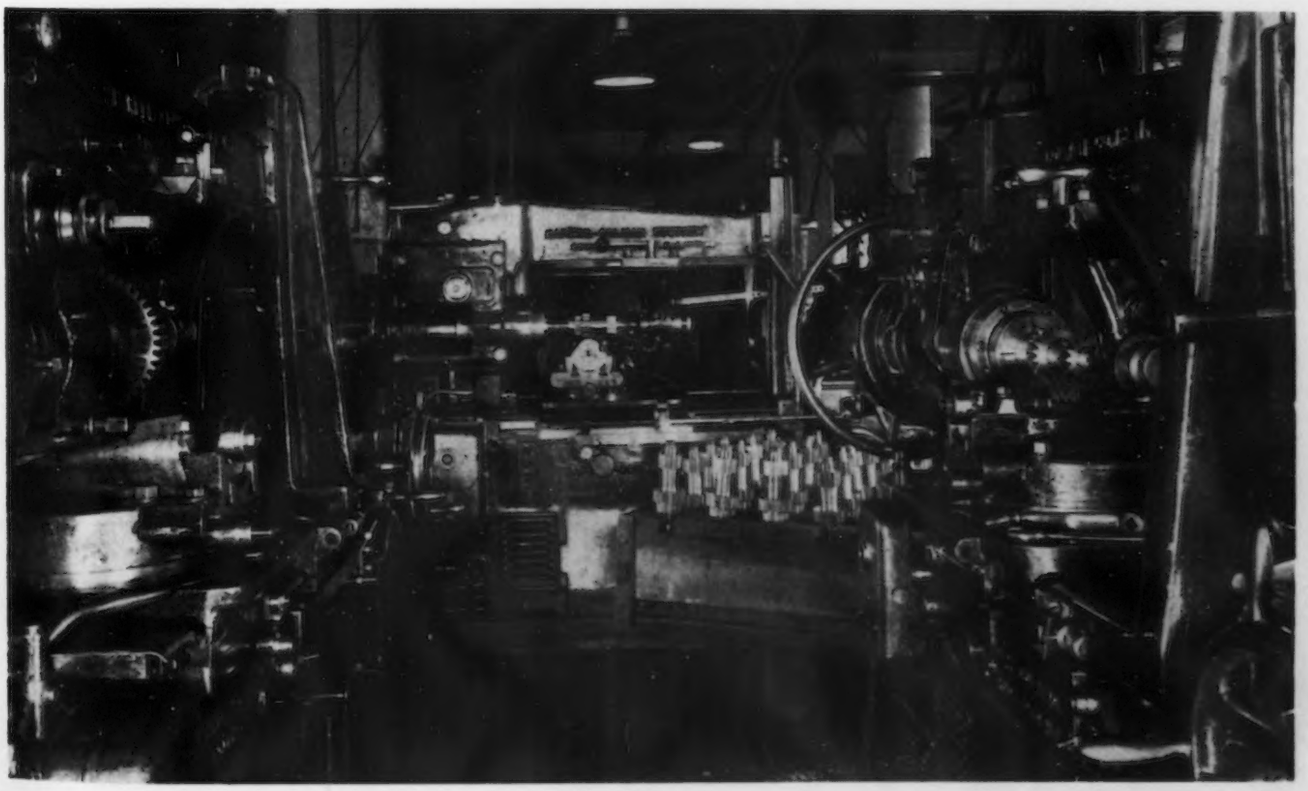


FIG. 2—Michigan-860 rotary crossed-axis type gear shavers are used for finishing all Fuller gears. Before removing from arbors, gears are placed on the Norton grinders to the right and left of the shavers for grinding the o.d. of the gears. Only 14 cutters are required to shave 300 active gear types.

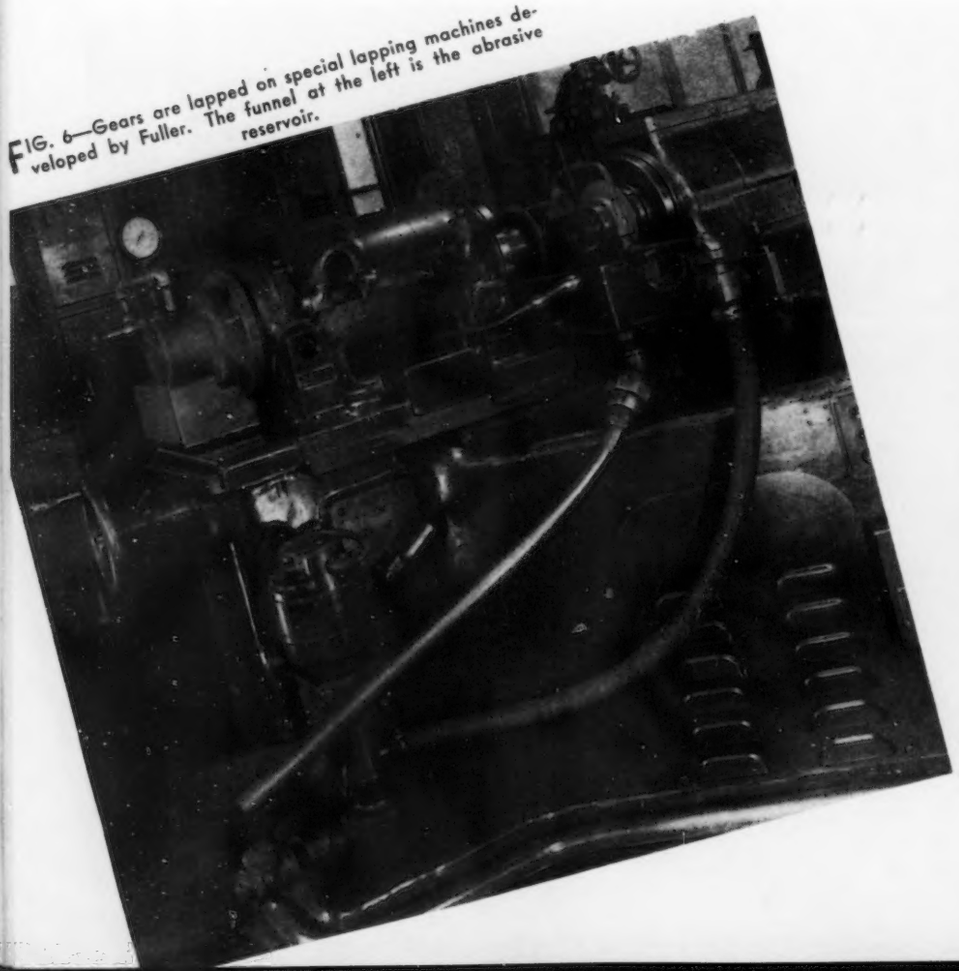


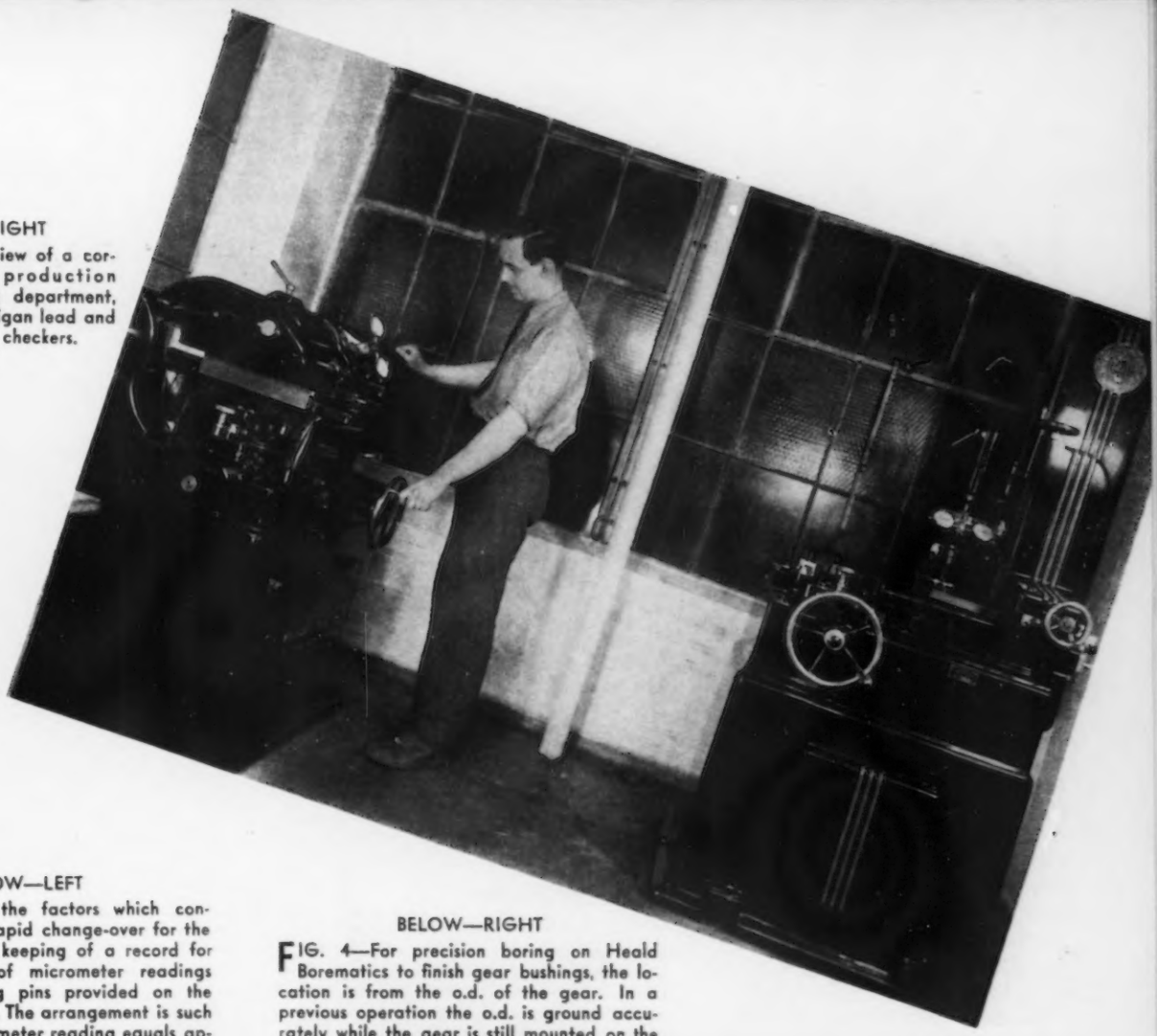
FIG. 6—Gears are lapped on special lapping machines developed by Fuller. The funnel at the left is the abrasive reservoir.

it has been found. Excellent interchangeability of gears is secured.

After assembly into transmissions, all gears are checked for quietness under load. Reason given for this is that quietness of gears is a greater problem in trucks, for instance, than in passenger cars, since the former are not as heavily insulated for noise as are pleasure vehicles. The noise problem in trucks is particularly acute with overdrive gears.

It was largely to obtain the quietest gears possible that Fuller selected gear shaving for the finishing operation. Since then it has been found, however, that the shaving operation has apparently increased gear life, while being considerably faster and less costly than either finish hobbing or shaper cutting. For the roughing operation, furthermore, class B ground hobs have been found highly satisfactory when followed by shaving.

The installation of the new equipment at Fuller, incidentally, is credited with a not inconsiderable reduction in manufacturing costs, aside from the economies in tooling costs effected with the gear design method.



AT RIGHT

FIG. 5—A view of a corner of the production gear-checking department, showing Michigan lead and involute checkers.

BELOW—LEFT

FIG. 3—One of the factors which contributes toward rapid change-over for the gear shaver is the keeping of a record for each gear type of micrometer readings across the locating pins provided on the table of the shaver. The arrangement is such that 0.001 in. micrometer reading equals approximately 0.0001 in. adjustment on lead.

BELOW—RIGHT

FIG. 4—For precision boring on Heald Borematics to finish gear bushings, the location is from the o.d. of the gear. In a previous operation the o.d. is ground accurately while the gear is still mounted on the shaver arbor.

INDUSTRIAL APPLICATIONS OF

CHAPTER 41 of a Series on the Methods and Equipment of Industrial Power Transmission.

o o o

CONTINUING the discussion of hydraulic drives begun in Chapter 40 of this series (Characteristics of Hydraulic Drive Transmissions, THE IRON AGE, April 13, 1939), it will be of interest at this point to quote the words of the noted British authority on this subject, Mr. Harold Sinclair, as to the differences between the two hydraulic drive systems now in widespread use:

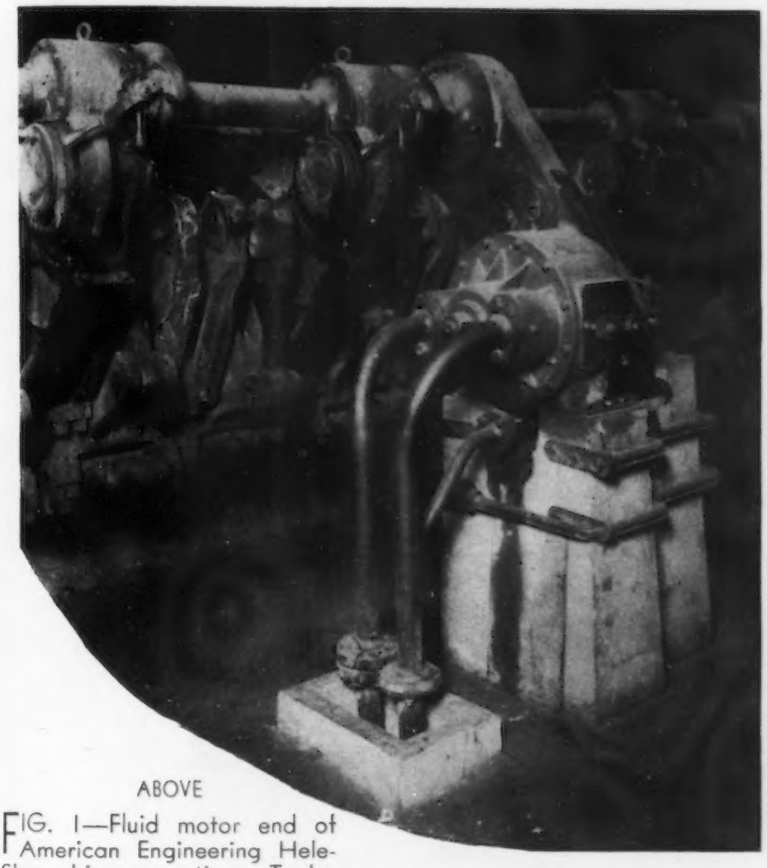
"Owing to the positive character of the displacement (hydrostatic) type of transmission, its characteristics are strikingly different from those of the turbo (hydrokinetic) transmissions, and there is a considerable range of applications for which hydrostatic gears are ideal, but for which turbo transmissions have little or no scope. In particular one may mention ship's steering gears, gun-training mechanisms, hydroplane controls, machine tool feeds, printing and calender drives, and all applications of low or medium power requiring precise speed regulation over a wide range of torque and speed, and a constant speed of the output shaft practically irrespective of changes in load. Turbo transmissions are not generally suited for such purposes, on account of the turbine characteristic that the speed is responsive to changes in load.

"It is this feature, incidentally, that permits of the automatic variation of torque with speed that is so useful in the torque converter. Where the load fluctuations on a turbo-coupling of the variable-filling (scoop-tube) type are not very rapid, such speed changes can be corrected by a governor gear, but the natural characteristic is broadly similar to that of a shunt-wound direct-current motor, or a slip-ring alternating current motor with a variable resistance in the rotor circuit. The turbo-coupling is inherently simple. It comprises merely a primary shaft with its impeller, and a secondary shaft with its turbine runner; there are no fine running clearances, heavily loaded bearings, or parts affected by distortion.

"There is a wide field of application in which either the hydrokinetic or the hydrostatic transmission can be utilized. As regards variable speed drives, the efficiency of the hydraulic coupling with its variable filling or slip control is definitely superior at the high-speed end of the range, but falls below that of the hydrostatic type when working at a large speed reduction. In the case of fan or centrifugal pump drives this is unimportant, since the load falls off rapidly with reduction in speed and the actual energy loss in the transmission is small. On the other hand, for constant-torque drives, the hydraulic coupling offers the convenience of infinitely variable speed regulation, but gives no advantage in saving of

HYDRAULIC DRIVES

By FRANCIS JURASCHEK



ABOVE

FIG. 1—Fluid motor end of American Engineering Hele-Shaw drive, operating a Taylor stoker through a chain drive reduction unit.

AT LEFT

FIG. 2—Oilgear variable displacement fluid power pump unit furnishes the operating power for this 500 ton Farrel-Birmingham metal forming press.

power when running at reduced speeds. The hydraulic coupling offers advantages in the shape of light-load starting, limited stalling torque, and flexibility of connection in both the lateral and torsional senses; but its outstanding feature is mechanical simplicity and smooth, vibrationless drive."

The illustrations reproduced herewith are all fairly representative of current hydraulic drive practice. Careful consideration of these applications will show that Mr. Sinclair's summary is essentially fair and logical

Hydrostatic Type Application

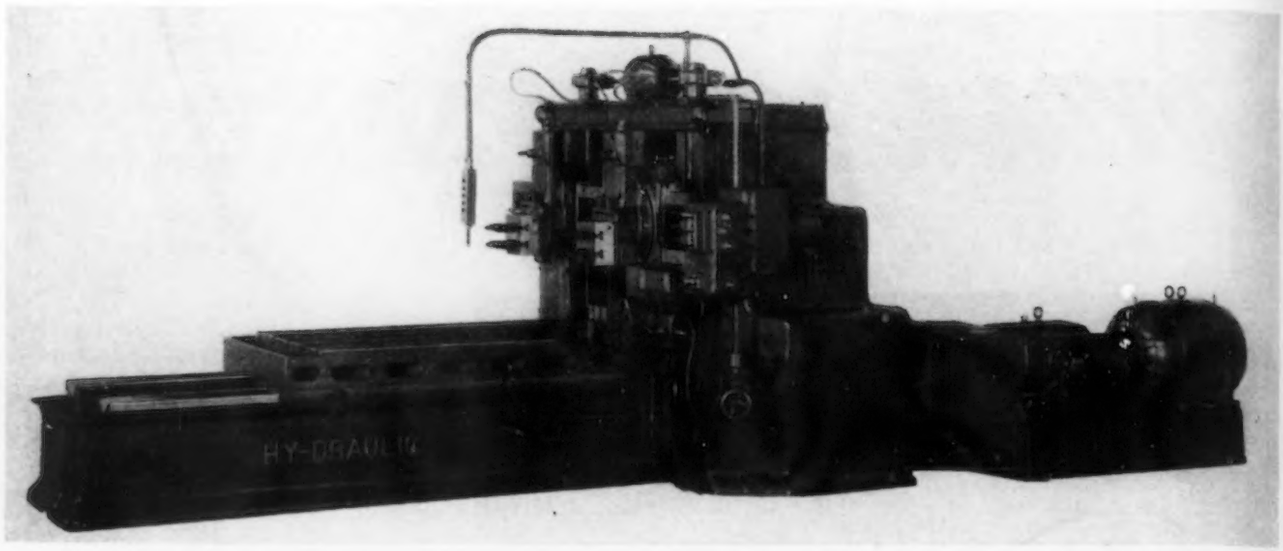
Fig. 1 shows the fluid motor end only of an American Engineering Hele-Shaw drive connected by means of a chain drive to the driving shaft of a large Taylor stoker. Such stokers must be capable of operating efficiently over a wide range of burning rates, from a banked condition to several hundred per cent of boiler rating. Speed ranges as high as 30 to 1, with accurate control of any intermediate speed, may be required under such circumstances.

The variable displacement pump unit of the hydrostatic system, used without the corresponding fluid motor, has a wide range of applications where the driven mechanism requires linear motion instead of rotary motion. One of the most familiar examples is, of course, the hydraulic press in all its varied forms. Typical of this application is Fig. 2, a 500-ton metal forming hydraulic press made by Farrel-Birmingham, operated by an Oilgear two-way variable displacement fluid power pump. Smooth ram movement with sensitive hand lever control enables the operator to bring the large crosshead down to the work at high speed without impact, automatically changing to a slower variable speed for the metal forming operation. A variable, preset tonnage is then held on the metal long enough to permit it to flow into its formed alinement.

It is of major interest to note the trend toward the use of hydraulic drives for the feed-control mechanisms of many machine tools. Fig. 3 shows the Rockford Machine Tool Co.'s Hy-Draulic planer, of which the maker says, "Oilgear controlled fluid power for operating the table and cross-feed is the outstanding feature of our Hy-Draulic planers and shaper-planers—smooth-flowing power is applied in a straight line close to the table-ways, cutting speeds are variable up to 75 ft. per min. or more, table return speeds are independently variable up to 150 ft. per min. or more, table reversals are smooth and without shock, and cutting speed is attained almost instantly."

An American Engineering Hele-Shaw hydraulic pump and hydraulic motor in a separate unit combination is shown in Fig. 4, driving the grinder table on a Diamond Machine Co. surface grinder. Here the speed of the table may be varied to suit the material and the amount of feed required for each pass. The table reverses automatically, quickly and smoothly.

Fig. 5 illustrates three Oilgear variable displacement pumps equipped



ABOVE

FIG. 3—The tabl and cross feeds this Rockford H Draulic planer ar actuated and co trolled by Oilgea fluid power drive unit

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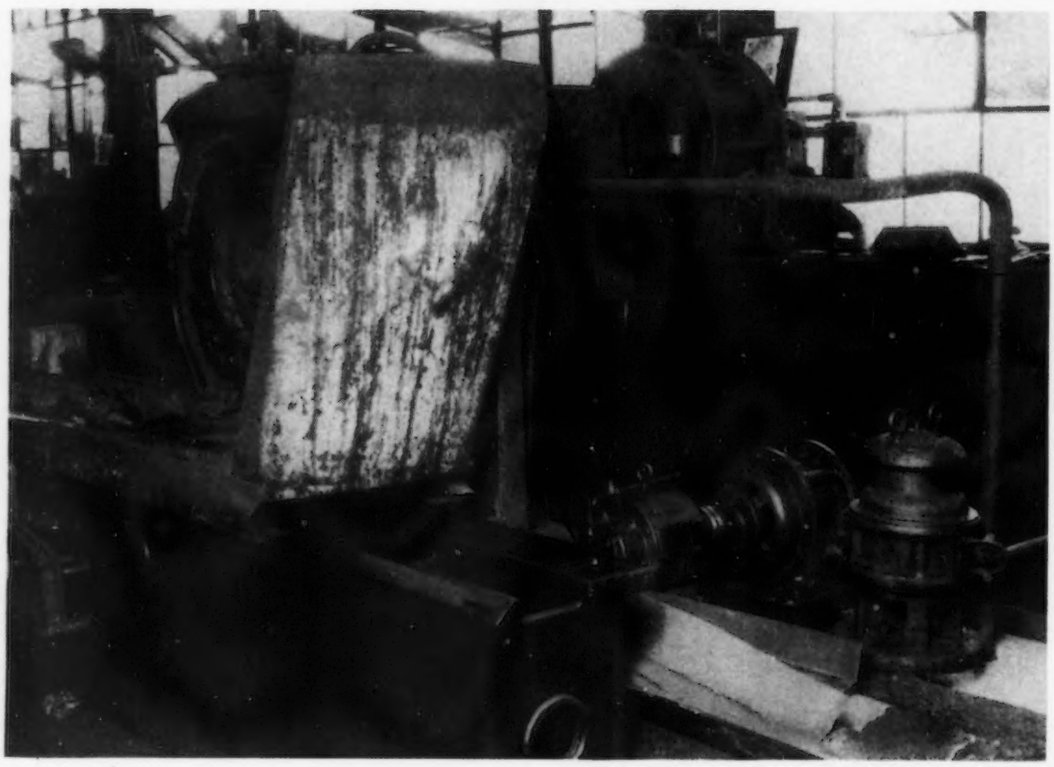

AT LEFT

FIG. 4—American En gineering Hele-Sha fluid power pump an motor units actua the table feed on th Diamond Machine C surface grinder.

o o o

BELOW

FIG. 5—Three O gear variable di placement pumps wi individual motor mounted as a uni serve three Oilge fluid motors (not show delivering 180 hp. to large printing press

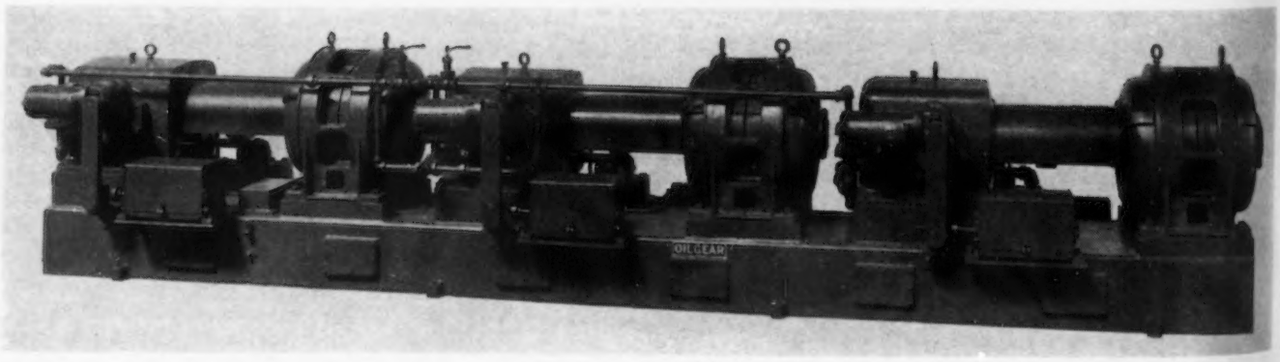

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FIG. 6—The Vickers complete hydraulic transmission unit comprises within a single housing a variable displacement pump and a fluid motor.

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BELOW

FIG. 7—American Blower Vulcan-Sinclair variable speed hydraulic coupling of 350 hp. capacity driving a forced draft fan in a central station.

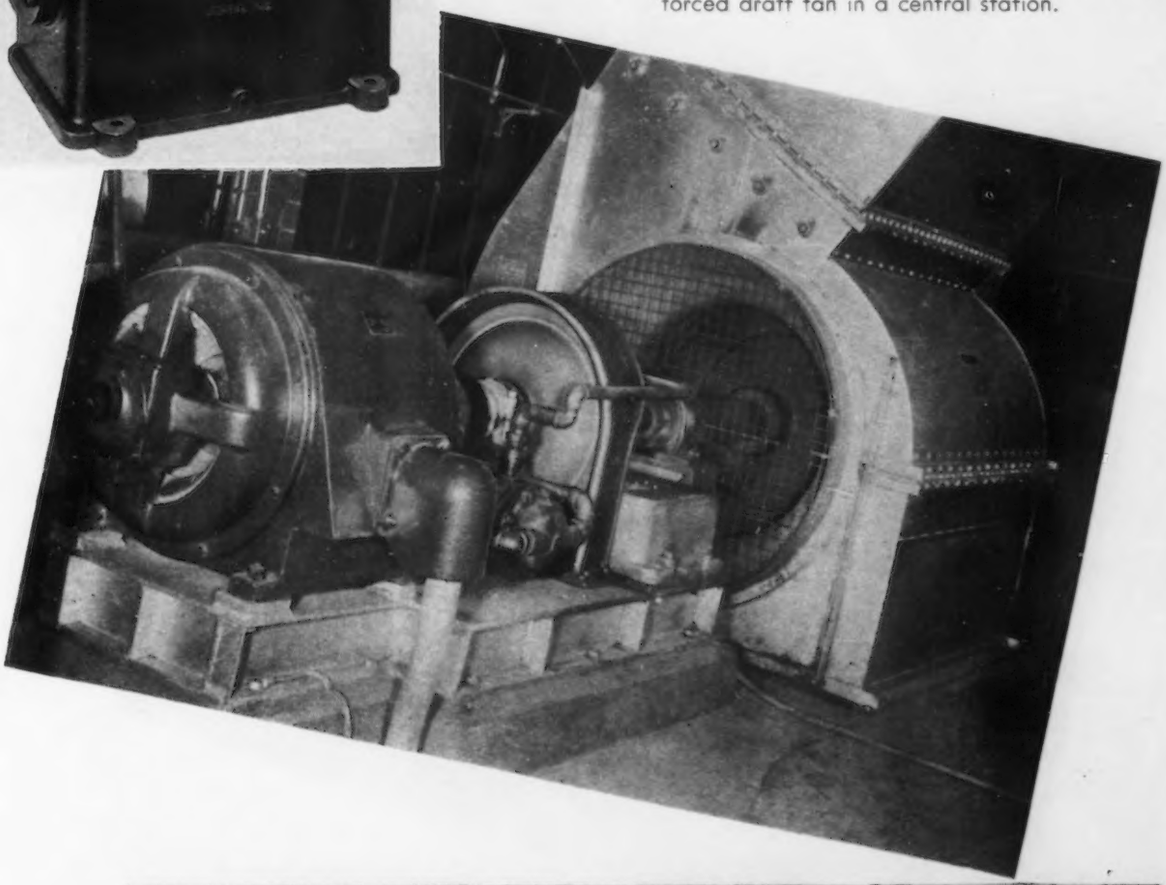

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FIG. 8—A constant torque application of a Vulcan - Sinclair coupling of 50 hp. capacity on a shade cloth calendering machine in a textile plant.

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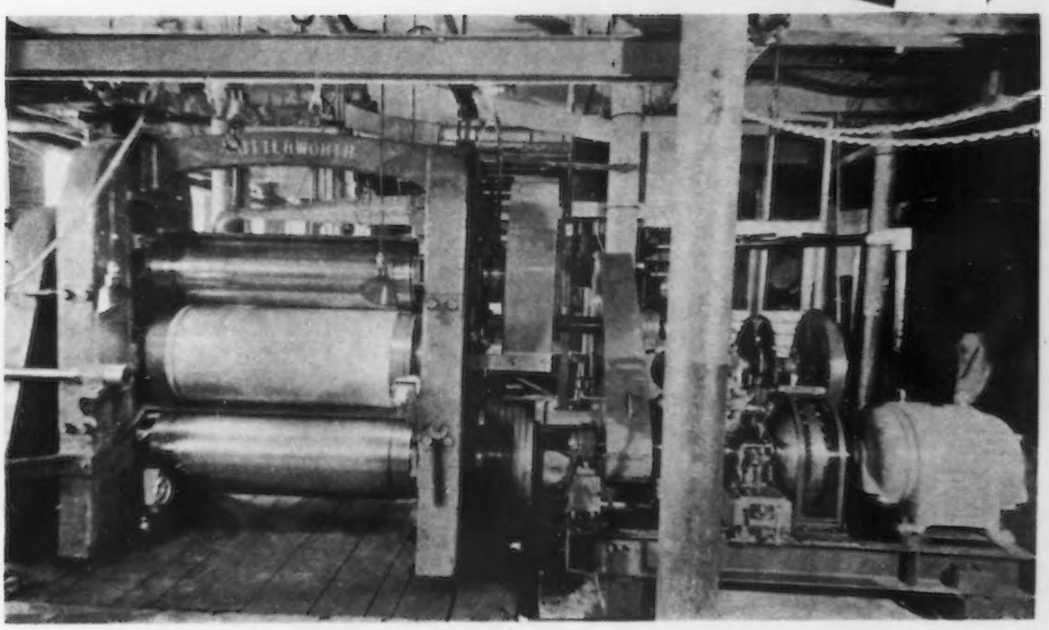

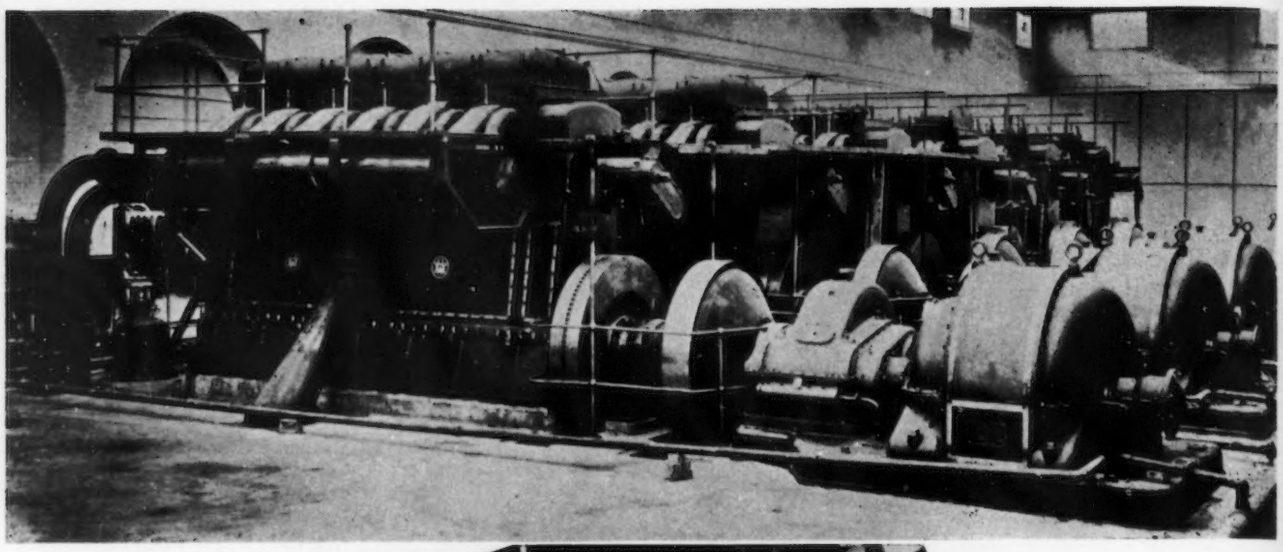

ABOVE

FIG. 9—Vulcan-Sinclair couplings connect diesel engines running at 300 r.p.m. through step-up gears to turbo-blowers running at 3000 r.p.m.

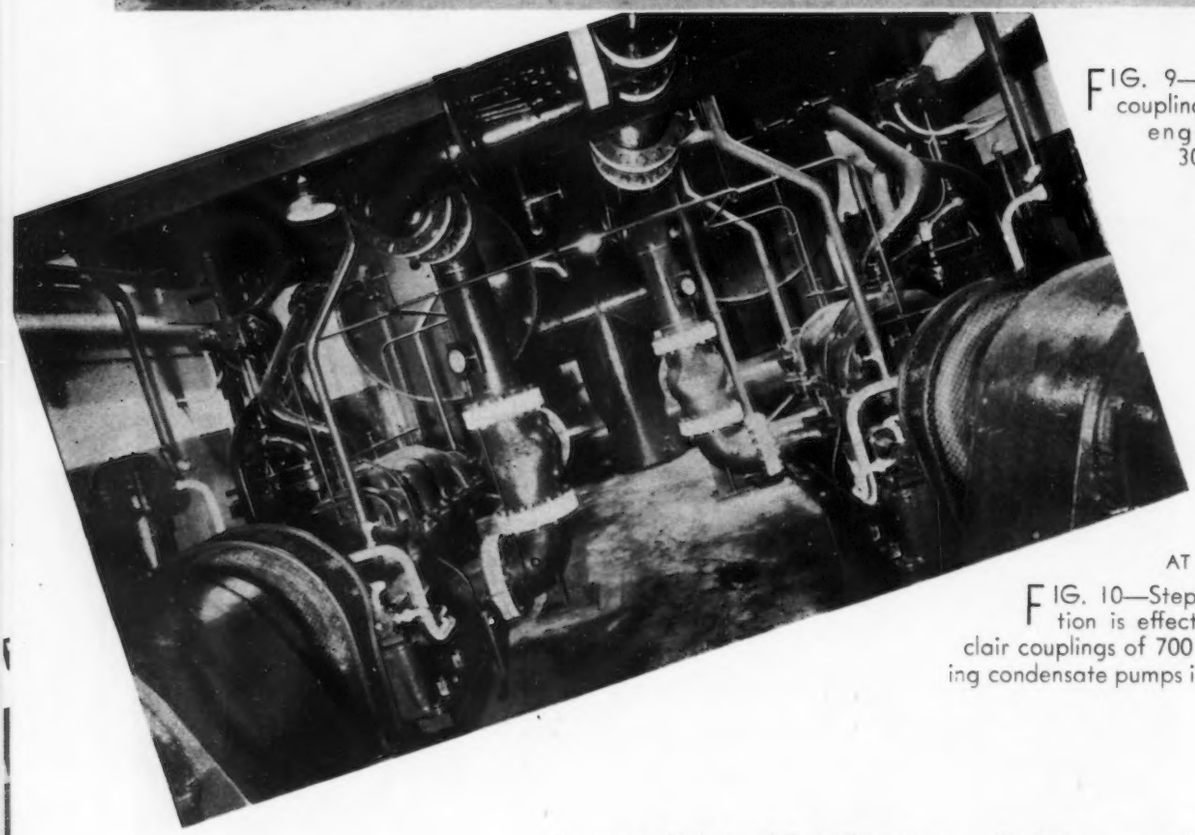

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FIG. 10—Stepless speed regulation is effected by Vulcan-Sinclair couplings of 700 hp. capacity driving condensate pumps in a central station.

with electric remote controls, all mounted on one long welded steel base reservoir, and each direct connected to individual electric motors. These pumps supply fluid power to three Oilgear constant displacement fluid motors to furnish a combined drive of 180 hp. to a large printing press.

In Fig. 6 there is shown the recently developed Vickers complete hydraulic transmission unit, which includes a pump and fluid motor within the single housing. This particular model is equipped for manual adjustment of the output shaft speed, but other types of control are also available.

It is essential to note that, as has been shown, the pump and the fluid motor of any hydrostatic drive system may be mounted integrally, or may be separate units located close together or at widely separated points, as has been shown above. When combined in one unit mechanism the electric motor which drives the pump may, or may not be incorporated into the combination unit. A very wide range of flexibility is offered in this respect by practically all manufacturers.

A new development of the hydrostatic type which is attracting considerable attention is the Watson-Stillman variable displacement pump. In this pump, multiple pistons operate in a tilting cylinder block, as in the Vickers pump, but the piston drive is a reciprocating motion instead of a rotary motion. The Watson-Stillman pump is especially adapted to high pressure work as found in hydraulic presses.

Hydrokinetic Applications

Practically all American applications of hydraulic couplings in the industrial field are of the Vulcan-Sinclair coupling as made by Ameri-

can Blower Co. Although the introduction of this coupling in this country is of comparatively recent date in so far as industrial applications are concerned, the Vulcan-Sinclair coupling and its prototypes are well known in Europe, where many industrial applications have been made as well as marine and automotive drive applications. Most of the American industrial applications to date have been on forced and induced draft fans, but a number of successful installations have been made on compressors, pumps, oil-drilling rigs, power shovels, and coiling and winding machines. These installations range from three to 1000 hp., and cover applications in manufacturing plants in many lines of industry as well as a number of large public utility central stations.

Fig. 7 shows a Vulcan-Sinclair variable speed (scoop-type) hydraulic coupling interposed between an electric motor and a forced draft fan in a public utility station. This coupling transmits 350 hp. at 1160 r.p.m. and has a variable speed range of 5 to 1. It makes possible, with a standard induction motor, the close regulation of fan-speed control normally associated only with direct current motor, or slip-ring alternating current motor operation.

Constant torque machines differ from fans and centrifugal pumps in that the power required to drive them varies directly with the speed, whereas the power required by a centrifugal pump or fan varies as the cube of the speed, and the torque varies as the square of the speed. This limits the permissible speed range to a maximum of about three to one. Within these limits the stepless control features of the hydraulic coupling make it admirably adapted to many industrial processes. For instance, Fig. 8 shows a Vulcan-Sinclair hydraulic coupling installed on a shade cloth calender, delivering 50 hp. at 1750 r.p.m. As constant torque machines in most instances operate at relatively low speeds, the usual practice is to use a moderately high speed motor and hydraulic coupling, with a reduction gear, chain or V-belt between the coupling and the driven machine. In this case a chain drive is used, reducing the speed of the calender drive-shaft to about one-quarter that of the hydraulic coupling.

Another interesting hydraulic coupling drive is that of the turbo-blower. Here the driven machine speed is higher than that of the power source, necessitating a step-up mechanism. Fig. 9 shows six 3000 r.p.m. turbo-blowers in a British sewage treatment plant, driven from 600 hp. diesel engines operating at 300 r.p.m. through Vulcan-Sinclair hydraulic couplings of the traction type, and step-up gear units. The use of hydraulic couplings here makes it possible to start the diesel engines at practically no load, the couplings automatically picking up the load smoothly and quickly without shock, and likewise preventing any torsional vibration from the engine reaching the gears.

Fig. 10 shows a recent installation of two 700 hp. Vulcan-Sinclair hydraulic couplings on condensate pump drives in a large public utility central station. These couplings are of the variable speed type, and effect a 25 per cent speed regulation between the 1180 r.p.m. electric motors and the driven pumps, steplessly controllable over this range. The couplings are guarded by wire screens.

The remote control of speed variation in the variable speed types of hydraulic couplings may be effected manually or automatically. For manual control a small reversible pump is generally located on the oil reservoir, from whence a line of piping runs to the coupling manifold. The direction of flow of the oil through the reversible pump may be governed electrically or mechanically from a distance, or manually at the point of control, and the operation of this pump serves to introduce more or less oil into, or to take oil out of, the operating chambers of the coupling. Certain types of automatic control mechanisms also use a reversible pump as the actuating member.

Other types of automatic control require a continuous running pump and regulating valves to add or remove oil from the coupling circuit. In this system the oil runs under a constant head, regulated by a relief valve. At any one operating condition the control valves assume a neutral position such that no oil is added to or removed from the coupling circuit; that is, the volume of oil in the coupling circuit, although continually moving in and out, is maintained at a constant value. However, should a speed change be required, the control valves will open so that the quantity of oil in the coupling circuit is changed to meet the control demand. This condition satisfied, the valves then automatically return to the neutral position.

The traction type hydraulic coupling has been used successfully on conveyor drives to provide overload protection for the driving motor, and to achieve load equalization on multi-unit drives. The latter purpose is deserving of careful consideration, especially on conveyors of the lengths so frequently found in the automotive industry. When the load on one section of the chain becomes too heavy for the nearest drive motor, the coupling on that motor slips a bit more, and thus passes part of the load along the line to the next drive motor on the conveyor.

The same coupling is applicable to all heavy starting loads such as swing-bridges, jack-knife bridges, all kinds of centrifugals, overhead cranes, mine hoists and similar types of mechanisms. Since the traction coupling permits throwing the motor directly across the line, its use involves relatively simple motor controls in such cases.

Du Pont Revises Data on Electroplating

THE following new and revised literature on electroplating is available from the R. & H. Chemicals Department of E. I. du Pont de Nemours & Co. Cadalyte "38" manual, giving recommended methods of preparing, controlling and analyzing the solution.

Electrotinning manual, describing recommended practices for the operation of the sodium stannate-acetate electrotinning process. Standard methods of preparing, controlling and analyzing the solution are all given.

Carbonate remover, describes the effect of carbonate on cyanide plating solutions; the determination of carbonate and its removal are discussed.

Electroplating chemicals booklet treats in brief form the chemicals, processes and materials of interest to electroplaters and describes each of these, outlining the part it plays in efficient, economical plating.

Carburizing salt service bulletin describes a new development—du Pont carburizing salt—for producing deep high-carbon cases on plain carbon and alloy carburizing steels.

Accelerated salt bulletin describes the new cyanide mixture of uniform composition for the production of mixed carbon-nitrogen cases on plain carbon and alloy carburizing steels. A 40 per cent saving of time in the production of shallow cases is claimed.

New Machine Tools To Meet New Demands

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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EQUIPMENT announced by the machine tool builders during the month of April includes an improved type of manufacturing miller in which flexibility of hydraulic cycle control is adapted to a mechanical feed type machine; a duplex keyway miller of wide adaptability; an unconventional type of one-stick honing machine; a new size of open end band saw machine for die work; and a very heavy duty threading and boring machine for oil well pipe couplings. Two lathe manufacturers announce further refinements in their lines. Also described in this monthly review is a free floating drafting machine in which all moving parts are enclosed.

ESPECIALLY suited for the fast, economical production of small parts for business machines, small arms, cash registers, sewing machines, typewriters, automobiles and aircraft are the newly improved Nos. 1-12 and 1-18 plain automatic milling machines just introduced by the *Cincinnati Milling Machine Co.* Of 12 and 18-in. table travel respectively, these manufacturing type machines are a mechanical feed type with some hydraulic features and incorporate a number of design changes over the earlier models.

All feed changes are obtained by pick-off gears located in a compartment in the knee as before, but control of the clutches for rapid traverse and feed is effected through an auxiliary hydraulic circuit. The table dogs actuate the pilot valves. A backlash eliminator nut on the feed screw is also energized hydraulically from the pilot valve controlling the feed cycle. This new feature makes the machines adaptable for climb milling operations. The backlash nut pulls the leadscrew always in the direction of feed, thus preventing forward movement of the table under cuts.

Standard feed range is now ¾ to 30 in. per min. in 16 steps. High series, up to 60 in., and a low series, ½ to 21½ in., can also be supplied. Rapid traverse is at the rate of 300 in. per min., and it is possible to obtain dog controlled intermittent feed and rapid traverse in any combination or in either direction. There are now 16 spindle speeds available, from 50 to 1500 r.p.m., obtained through heat treated pick-off gears and a back gear. A completely anti-friction drive is used in the train from the constant speed pulley, with double mounting of the front and rear bearings on the spindle. Spindle quill has an in-and-out adjustment of 2⅜ in. Table has been widened to 10 in. and has three T-slots in place of one.

Duplex Spline Miller

DEEP or shallow keyways on opposite sides of the same piece, or singly on two pieces simultaneously, through slots and similar work can be produced economically to a high degree of accuracy on the new M-80 4-in. spline miller recently placed on the market by the *Taylor & Fenn Co.*, Hartford. Spindle speeds up to 2385 r.p.m. combined with infeeds of the cutter from 0.0025 to 0.020 in. per rev. and table strokes from 2½ to 67 per min. adapt it particularly for the use of small diameter cutters. With the exception of placing and removing the work, the machine is semi-automatic in operation, the cutters automatically withdrawing to the starting position at the completion of the cycle. When another piece of work is placed in position, a partial turn of the handwheel that controls the cutter depth starts the next cycle.

Spindles are mounted in precision ball bearings in hardened and ground quills, and the depth of cut is controlled by cams under them. Table travel is effected by crank action, with the stroke changed by pick-off gears. Infeed of the cutters is varied by adjustment of a ratchet mechanism connected with the cams. The speed with which these adjustments may be made adapt the unit for short run as well as high production work.

Production Honing Machine

A SINGLE abrasive stick type of precision production honing machine has been introduced by the *Sunnen Products Co.*, 7900 Manchester Avenue, St. Louis. The new model MA machine itself is a bench type in which the work is held in the hands and located over a self-centering mandrel. Accuracy to 0.0001 in. out-of-round is claimed because of the three point principle of contact of the work, similar to that of centerless grinding, in this case at the single stone and at two guide shoes which are part of the mandrel. In honing out-of-round work, the stone starts cutting from

the high spots or the smallest diameter first. As the high spots are removed a wedge expands the stone to take up the diameter enlargement.

The cutting pressure may be set for light or heavy pressure. By means of a micrometer dial graduated in tenths of thousands, the desired amount of metal to be removed can be set in advance and an automatic stone feed-up expands the stone until this diameter is reached. Four spindle speeds are provided, from 250 to 820 r.p.m. A single foot pedal control starts the spindle rotating and the automatic feed. Mandrels, stones and truing sleeves for conditioning the stones are offered in a wide range of sizes.

Lathe Developments

A SPEED selector dial is now built into the headstock of the new line of Super Regal Lathes just announced by the *R. K. LeBlond Machine Tool Co.*, Cincinnati. The dial shows surface cutting speeds for commonly machined materials, the corresponding r.p.m. and lever settings. Heavier construction is used throughout the machine, particularly on the ways which have been reinforced to resist greater torque and cutting strains. Another feature is increased swing: 13¼ in. over the ways and 8¼ in. over the carriage on the 13-in. size; 15¼ and 10 in. on the 15-in. machine; 17¼ and 10½ in. on the 17-in. unit and 19¼ and 12 in. respectively on the 19-in. size.

AUTOMATIC apron with friction clutch drive for operating the power cross feed and the power longitudinal feed is found in two new models, A and B, of the standard line of 9-in. Workshop precision lathes made by the *South Bend Lathe Works*, South Bend, Ind. Model A has a quick-change gear box in the feed train, whereas model B has the standard change gear type used in the original model C lathe, which does not have the power cross feed and drives the apron through the lead screw. In the two new models the lead screw and half nuts are used only in cutting threads. Longitudinal and cross feed are obtained otherwise from a worm driven by a spline in the lead screw. The quick change box provides 48 changes for cutting right and left-hand threads, from 4 to 224 per in., and 32 longitudinal feeds, from 0.0014 to 0.0208 in. per rev. All gears are steel, precision cut. Likewise, the gears in the apron are steel, with the

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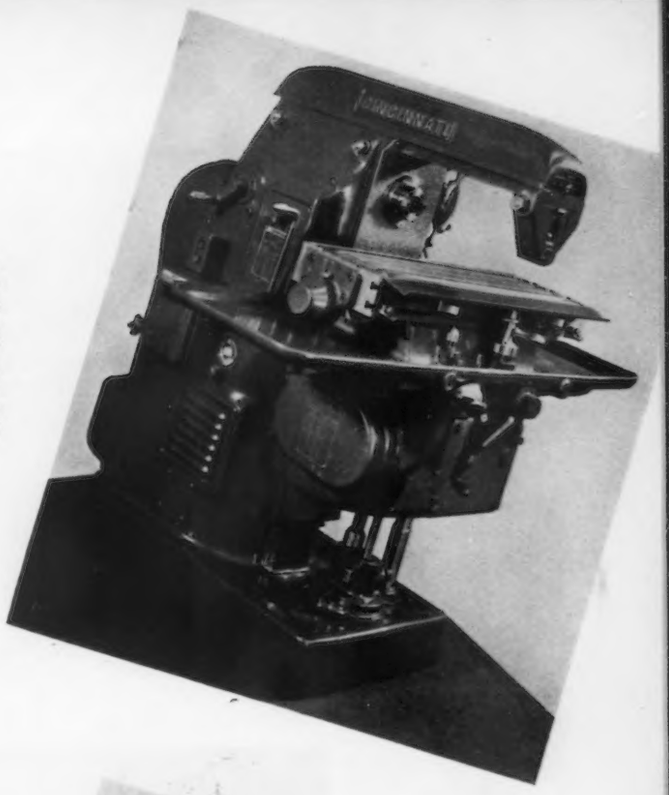
HYDRAULICALLY actuated cycle control of what is fundamentally a mechanical feed type machine is one of the design innovations found in this improved Cincinnati No. 1-12 manufacturing type miller for fast production of small parts.



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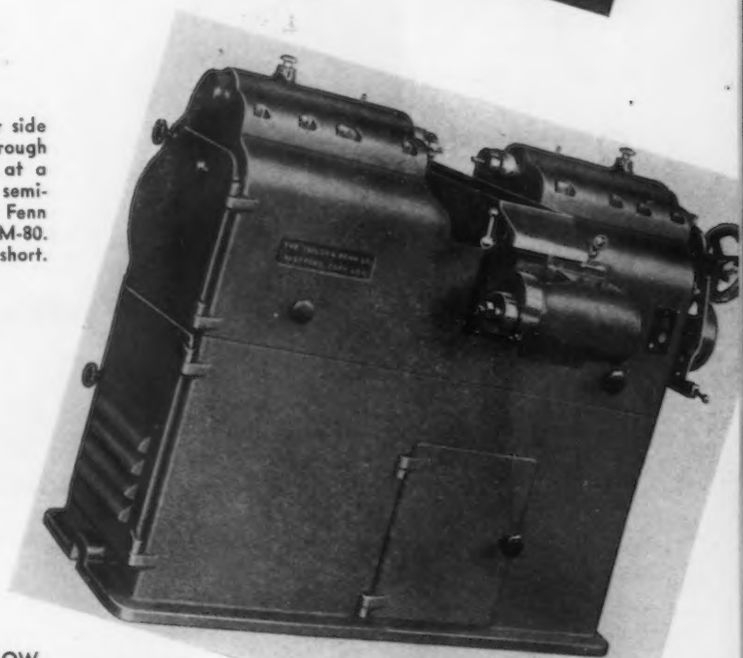
KEYWAYS on either side of a piece or through slots may be milled at a high rate in this semi-automatic Taylor & Fenn 4-in. spline miller, M-80. Changeover time is short.



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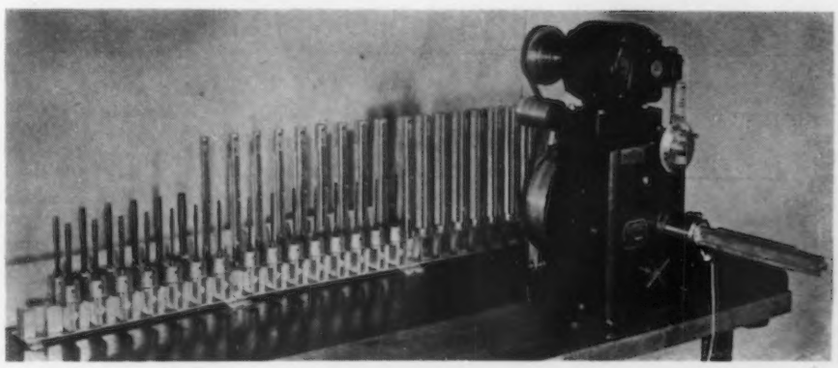
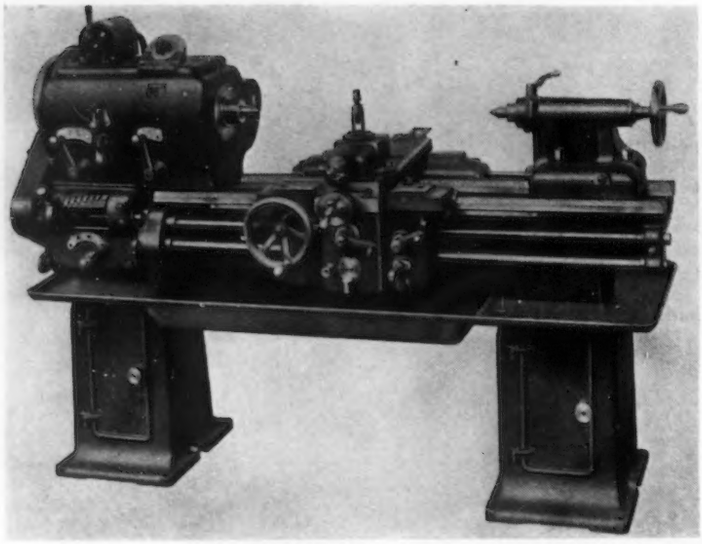
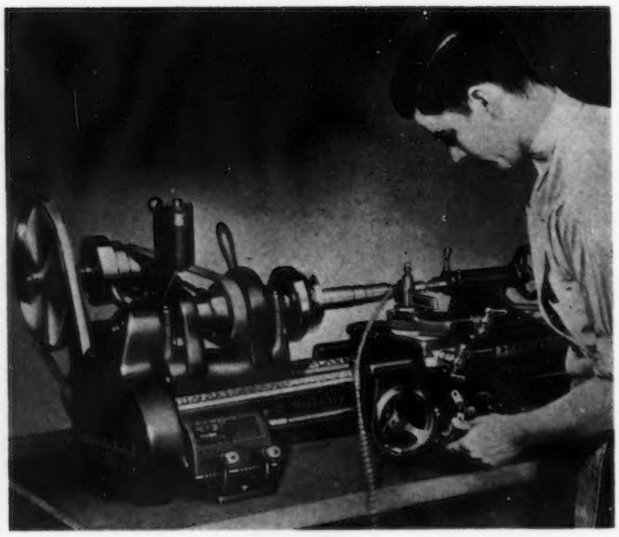
BELOW

WITH the set of mandrels shown, holes from 0.245 to 2.400 in. in diameter can be honed to within 0.0001 in. of size with the new Sunnen model MA precision honing machine, employing a three-point contact mandrel with single abrasive stick.





THE eight-speed headstock of this new 17-in. Le-Blond Super Regal lathe has a built-in speed selector as an aid in efficient turning.



QUICK change gear box and automatic apron with friction clutch drive for operating the power longitudinal and cross feeds are found on this Model A South Bend 9-in. precision lathe, shown in the bench style.

teeth cut on precision hobbing machines.

All three models are available in both bench and floor types, with bed lengths of 3, 3½, 4 and 4½ ft. Several types of drive are offered, including a 12-speed horizontal motor drive. Ordinarily, the back-geared headstock has six spindle speeds. A hardened headstock spindle is standard equipment on models A and B. Spindles have a ¾-in. hole and collet capacity up to ½ in.

Open End Band Saw

FOUR years ago *Grob Brothers* of Grafton, Wis., introduced an open end band saw in which a saw blade 150 ft. long is wound helically on a threaded groove drum and then is reversed at high speed at the completion of the cut. Recently they have brought out an improved machine of smaller size (14-in. throat) for sawing out of medium and small size dies, punches, stripper plates and similar parts. A multiple speed motor provides the forward or cutting speed and a second motor reverses the 150-ft. band at high speed. Reversal takes place in 10 sec. in the new unit, and for the slowest feed, cutting time is 2½ min. The machine accommodates saw blades 1/16, 3/32 and ⅛ in. wide. The table tilts four ways and measures 20 x 20 in.

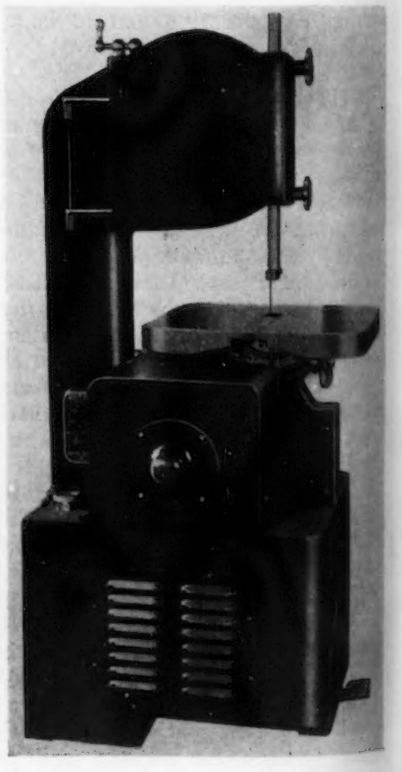
Several advantages are claimed for this type of machine over the conventional contour saw with welded blade: smooth cutting action, since at no time does a welded portion of the blade pass through the work; and positive drive to the blade, permitting practically the full tension to go into the work of sawing instead of using a good portion of the saw blade tension to properly drive the blade when the endless principle is used. A saw guide assures proper alinement of the blade, full support above and below the work, and long life to the blade.

Pipe Coupling Threader

BOTH ends of high pressure pipe couplings used in the oil industry can be finish bored and threaded in one set-up in a new single-spindle vertical machine recently built by the *National Acme Co.*, Cleveland. These model VT machines are offered in three maximum chuck capacities of 4½, 8⅝ and 13⅜-in. A.P.I. sizes. Change gears control the lead screw travel and provide for different pitches. Rapid traverse of the head to and from the work is accomplished through a hydraulic cylinder and the travel is automatically stopped before the split nuts are engaged on the lead screw. Style RES-L Namco positive acting collapsing taps are standard equipment on these machines.

BELOW

TYPE OS-14 is a new size of Grob open end band saw in which some improvements have been incorporated.



Work holding chuck is mounted in an indexing plate which is held rigid by an automatically actuated lock bolt while the tap is floated vertically into the work. After one end of the coupling has been threaded, the head withdraws, the chuck is indexed 180 deg. about trunnion bearings and the cutting operation is repeated. Beneath and clear of the chuck is located a swinging gage or stop which is adjustable for accurate gaging of the coupling to its correct height for tapping. Back of the plate a vertical door swings forward and guides the finished coupling to a conveyor at the rear.

Adjustable chucking pressure is applied hydraulically to six jaws and is recorded on gages at front and rear of the machine. Chuck indexing is by means of a hydraulic motor. The forged spindle is mounted in precision anti-friction bearings and is driven through its splined end. The free floating mechanism is fully enclosed and operates in oil between hardened and ground steel plates. The machine is completely protected by interlocks. A slightly modified model is supplied for rough boring operations only.

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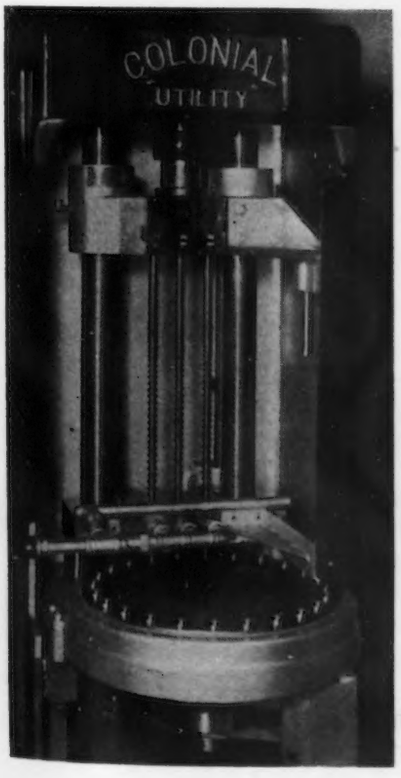
NEW model VT vertical boring and threading machine announced by National Acme is designed especially for precision threading or finish boring of pipe couplings to A.P.I. standards required for high pressure work in the oil industry. The machines are offered in three maximum chuck capacities in A.P.I. sizes.



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ALL moving parts, including the friction bands, are completely enclosed in light alloy housing in the new Dietzgen Free - Floating drafting machine.

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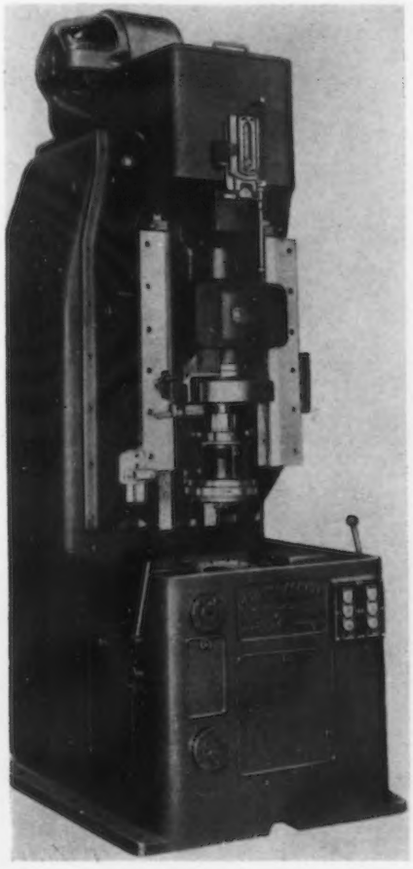

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OCCASIONAL failure of piston pins is due to fatigue cracks starting from tool marks in the bore. At one automobile company's plant, such failures have been virtually eliminated by the expedient of finish broaching and burnishing the bores with the set-up illustrated. The operation, performed on a Colonial utility broaching machine with hydraulic automatic index table designed for continuous cycle, is exceedingly fast—some 1400 pieces per hr. being produced on one machine. Three pieces are finished at each stroke since the burnishing rings are combined on the broaching tools. Pins are automatically ejected, but are loaded on the index table by hand.

Drafting Machine

THE new Excello Free-Floating drafting machine announced by the *Eugene Dietzgen Co.*, Chicago, is designed to minimize drafting fatigue, thereby contributing to greater accuracy on the part of draftsmen. The free-floating feature that accomplishes this is obtained by the use of aluminum alloys for the arms, ball bearing pulleys and close tolerances throughout the construction. All moving parts, including the bands, are completely enclosed and protected against dirt. The possibility of band breakage from temperature changes is eliminated by the use of non-continuous bands that incorporate an automatic tensioning arrangement which permits contraction without breakage, but maintains the necessarily high tension to prevent slippage. To compensate for the weight of the mechanism when the board is tilted, a self-contained spring gravity control is incorporated at the anchor, eliminating friction brakes and overhanging weights.

The protractor head of this machine also minimizes fatigue by placing control of angles directly under the thumb of the left hand. The head is self-locking at the commonly used angles, but may be locked at any intermediate angle. Machine can be had with a standard head with vernier reading to 5 min. of arc, or with a civil engineer's protractor head, with vernier reading to 1 min. of arc. Both types are for drawings up to 36 x 60 in.

Variable Stroke Drop Forging Hammer

VIEW of new Ajax variable stroke drop hammer in action. This drop forging hammer operates without boards, by means of a rigid steel lift rod operated by friction rolls.

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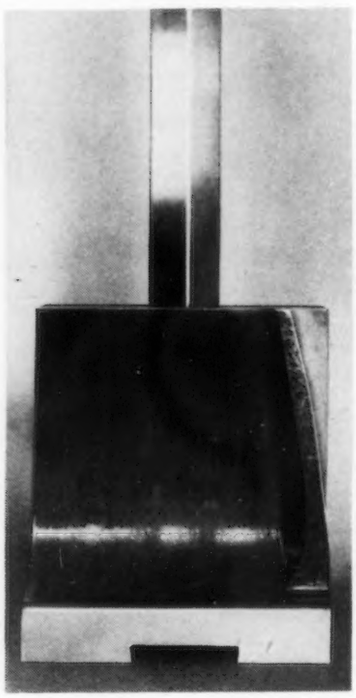
A DROP forging hammer operating on entirely new principles is being introduced by the Ajax Mfg. Co., Cleveland. Instead of boards for lifting the ram, a heavy square steel lift rod, taper fitted in the ram, and installed on the diagonal, is acted upon by rolls with rims built up of laminated friction material grooved to contact the rod on all four sides. Because of their transverse mounting, these friction rolls are of large diameter without overhanging the head frame, and in consequence have a wide arc of contact with the rod, resulting in low unit pressures and negligible wear.

The rolls are brought into and out of contact with the lift rod through rocking of eccentric hubs in which their shafts are carried by means of a small diameter air cylinder. A differential valve on the air line to this cylinder, governed by the amount the operator depresses the treadle, controls the height to which the ram is raised before it is released, and makes it possible to strike blows of varied force—light, fast blows for fullering and heavy blows for finishing. On full stroke, the top of the lift rod is acted upon by a pneumatic accelerator cylinder which is connected to the shop air line and gives the ram a quick acceleration or recoil so that heavier blows are struck and in quicker succession than if acted upon by gravity alone.

The lifting mechanism is driven from a motor mounted on a spring cushioned platform through multiple V-belts to a fully inclosed flywheel. The gearing also is entirely housed within a gear case integral with the headframe.

The steel columns are non-adjustably fixed to the steel base, which weighs 20 times the ram weight, and the insert type guides are adjusted to give perfect die match by means of calibrated wedges, rigidly locked to prevent shifts. Base is an open-hearth steel casting. Double angle sowblock seat pockets the sowblock against front to back movement without the use of dowels.

A toggle action on the clamps which hold the ram in elevated position is released by exceptionally light foot pedal action. Performance of a hammer of this type in actual operation for practically a year indicates that several years' service can be expected of the renewable friction roll treads, and that production will run a substantial percentage above that of the ordinary type of drop forging hammers. The new hammers are being offered in a full range of standard sizes from 1500 to 6500 lb., and larger upon request.



ABOVE

THE ram and lift rod of new Ajax drop hammer. The steel lift rod is of piston-rod analysis ground to an accurate square, and taper fitted in the ram in a diagonal position.

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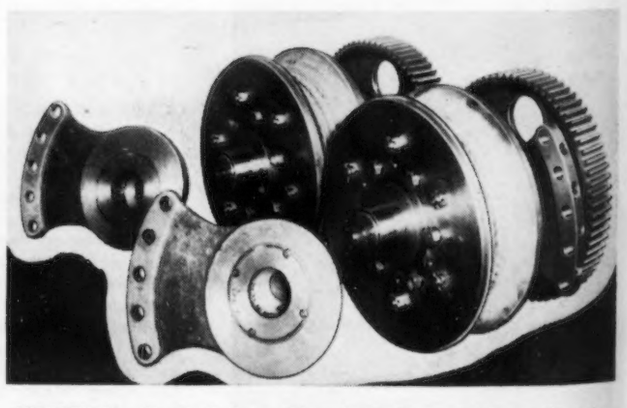

FRICTION rolls which fit on lift rod. Rolls are of large diameter, with demountable rims of wear resistant friction material, and are grooved to conform exactly to the lift rod.

How Big are INVENTORIES?

EDITOR'S NOTE—To answer the question "How Big Are Inventories?" of steel consumers and to determine whether hand-to-mouth buying at this time can be justified solely by the conclusion that supplies of raw materials and finished products are adequate, T. C. Campbell, Pittsburgh editor of THE IRON AGE, has made a survey which sheds light on the size of industrial stock piles. Results of his analysis, which covered 101 companies, are reported in the accompanying article.

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By T. C. CAMPBELL
Pittsburgh Editor of The Iron Age

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THE drive by American industry in recent years to reduce inventories seems, at last, to have run its course.

This is indicated in a study of inventories held by 101 companies which are among the leaders in various steel-consuming industries.

These 101 companies at the close of 1938, had inventories with a total money value approximately 23 per cent lower than at the end of 1937—a clear sign that representative consumers of steel now have their houses more nearly in order and that any marked improvement in general business should quickly benefit the steel industry.

A highlight of this survey was the discovery that at the close of 1938 inventories of six large automobile manufacturers were 26 per cent under the money value of inventories of the six companies at the close of 1937.

Combined money value of the 101 companies' inventories at the end of 1938 was about equal to total inventories at the end of 1936, and was 20 per cent greater than the record showed for the end of 1935. This substantial reduction in inventories from 1937 to 1938 was accomplished during a time when business conditions had started to point upward in the summer of 1938 and continued to climb until December, 1938. It is significant also that today's general level of business conditions is somewhat higher than the low point of 1938 and it is also interesting to note that most steel consumers have continued to reduce inventories since the end of 1938 as evidenced by hand-to-mouth buying.

Down 14% From 1936

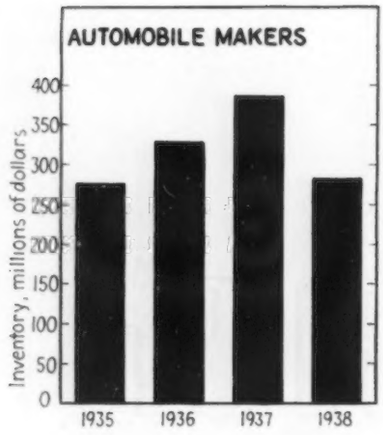
Analysis of the money value of six automobile companies' inventories, which disclosed a 26 per cent drop in 1938, also showed that year-end inventories in 1938 were 14 per cent below 1936 inventories and only 2 per cent above 1935, although automotive production during the latter part of 1938 had staged a substantial comeback.

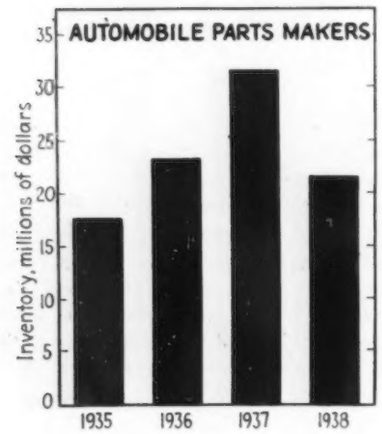
Combined inventories in terms of dollars for seven parts maker companies at the end of 1938 had declined 31 per cent from the same period in 1937, 8 per cent from 1936, but were 21 per cent greater than at the end of 1935.

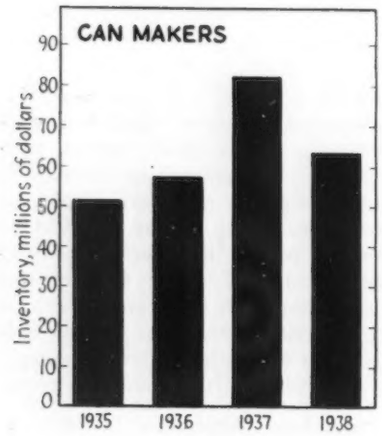
The group showing the least reduction in inventories has apparently been farm implement makers, but in many cases figures for these companies had to be taken as of Sept. 30 and Oct. 31, hence it can be assumed that substantial reduction has taken place since the latest 1938 figures were available. Combined inventories in dollar value for nine farm implement companies at the end of the 1938 inventory period, had declined 13 per cent from 1937, were 14 per cent higher than 1936, and were 35 per cent higher than 1935. The considerable variation shown by individual companies may be due to special conditions.

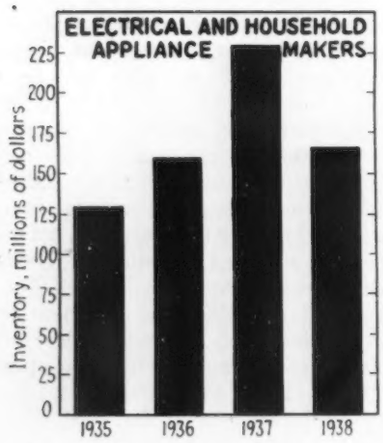
Household Appliance Inventories

Combined totals of 18 electrical and household appliance companies' inventories shows that at the end of 1938 a reduction of 27 per cent had been effected from 1937, and 1938 inventories were approximately 4 per cent greater than at the end of 1936 and 29 per cent greater than at the end of 1935. Since this group includes companies which, for the most part, manufacture so-called consumers' goods which moved exceptionally well during 1937 and 1938, the reduction in inventories seems to disclose close inventory control and warrants the opinion that these consuming companies will be in the market for steel prod-









Inventory Analysis of 101

(000 Omitted. Figures as of

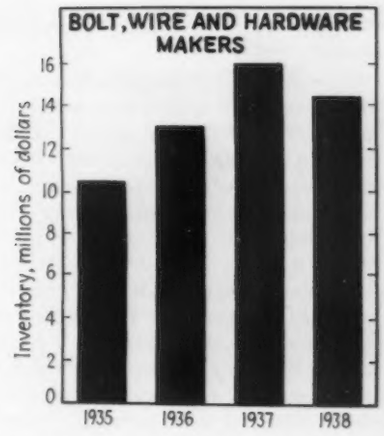
	Total Inventory				Per Cent Change 1938 From		
AUTOMOBILE MAKERS	**1938**	**1937**	**1936**	**1935**	**1937**	**1936**	**1935**
Studebaker Corp.	$6,534	$8,832	$7,756	$6,405	−26	− 16	+ 2
General Motors Corp.	199,872	279,146	225,645	196,325	−28	− 11	+ 2
Chrysler Corp.	46,624	50,133	60,565	48,766	− 7	− 23	— 4
Yellow Truck & Coach Mfg. Co.	12,997	20,840	15,338	9,958	−38	− 15	+ 30
(1) Packard Motor Car Corp.	8,544	15,137	9,965	8,109	−44	− 14	+ 5
(1) White Motor Co.	8,857	11,370	9,549	9,089	−22	− 7	+ 4
Total Automobile Makers	**$283,428**	**$385,458**	**$328,818**	**$278,652**	**−26**	**− 14**	**+ 2**
AUTO PARTS MAKERS							
Electric Auto-Lite Co.	$8,351	$11,282	$7,974	$6,328	−26	+ 5	+ 32
Motor Wheel Corp.	2,800	4,421	3,068	2,263	−37	− 9	+ 23
Budd Wheel Co.	925	1,523	1,356	985	−39	− 32	− 6
Budd Mfg. Co.	3,577	5,490	3,756	2,598	−35	− 5	+ 38
Murray Corp. of America	3,497	4,253	4,491	2,869	−18	− 22	+ 22
Ainsworth Mfg. Corp.	310	413	347	450	−25	− 11	− 31
Kelsey-Hayes Wheel Co.	2,032	3,896	2,383	2,298	−48	− 15	− 12
Total Auto Parts Makers	**$21,492**	**$31,278**	**$23,375**	**$17,791**	**−31**	**− 8**	**+ 21**
CAN COMPANIES							
American Can Co.	$36,153	$40,930	$31,757	$29,138	−12	+ 14	+ 23
Continental Can Co., Inc.	26,892	39,456	25,081	22,135	−32	+ 7	+ 22
Pacific Can Co.	342	1,619	339	195	−79	+ 1	+ 75
Total Can Companies	**$63,387**	**$82,005**	**$57,177**	**$51,468**	**−23**	**+ 11**	**+ 23**
ELECTRICAL & HOUSEHOLD APPLIANCES							
Apex Electrical Mfg. Co.	$985	$2,020	$1,384	$1,100	−51	− 29	− 11
Maytag Co.	1,866	2,345	2,103	1,884	−21	− 11	− 11
Easy Washing Machine Corp.	1,209	1,668	1,577	1,160	−28	− 23	− 4
Eureka Vacuum Cleaner Co., Inc.	621	1,080	873	642	−43	− 19	− 4
Westinghouse Elec. & Mfg. Co.	49,361	74,188	48,480	36,744	−33	+ 2	+ 35
Landers, Frary & Clark	2,405	3,584	2,626	2,662	−33	− 8	− 10
Birtman Electric Co.	563	685	628	532	−18	− 10	+ 6
Chicago Flexible Shaft Co.	1,137	1,134	969	672	0	+ 17	+ 69
General Electric Corp.	80,534	106,161	69,961	58,897	−24	+ 20	+ 37
Crosley Radio Corp.	3,028	4,040	2,536	2,287	−25	+ 20	+ 32
(2) Servel, Inc.	2,812	4,739	3,549	2,828	−41	− 21	− 1
(1) Borg Warner Corp.	10,712	13,692	13,032	9,158	−22	− 18	+ 17
National Enameling & Stamping Co., Inc.	1,925	2,839	2,431	2,215	−32	− 21	− 13
Electrolux Corp.	1,441	1,556	1,404	1,156	− 7	+ 3	+ 25
Perfection Stove Co.	1,267	1,653	1,611	1,260	−23	− 21	0
Savage Arms Corp.	1,465	1,961	1,360	1,453	−25	+ 8	+ 1
Florence Stove Co.	1,430	2,056	1,694	1,609	−30	− 6	− 11
Hobart Mfg. Co.	3,459	3,788	3,157	2,823	− 9	+ 10	+ 22
Total Electrical & Household Appliances	**$166,220**	**$229,189**	**$159,375**	**$129,082**	**−27**	**+ 4**	**+ 29**
BOLTS, WIRE AND HARDWARE							
Sargent & Co.	$1,676	$1,605	$1,386	$1,245	+ 4	+ 21	+ 34
Federal Screw Works	282	392	311	240	−28	− 9	+ 18
Lamson & Sessions Co.	1,356	1,657	1,396	1,041	−18	− 3	+ 30
Pittsburgh Screw & Bolt Corp.	2,037	2,216	2,403	1,663	− 6	− 15	+ 22
Acme Wire Co.	199	327	295	234	−39	− 33	− 15
Belden Mfg. Co.	1,165	1,423	1,385	1,211	−18	− 16	− 4
Fansteel Metallurgical Corp.	428	432	313	286	− 1	+ 37	+ 49
Simplex Wire & Cable Co.	976	1,170	300	250	−17	+222	+290
Yale & Towne Mfg. Co.	6,302	7,252	5,329	4,377	−13	+ 18	+ 44
Total Bolts, Wire, Hardware	**$14,421**	**$16,474**	**$13,118**	**$10,547**	**−12**	**+ 10**	**+ 37**
TANK MAKERS							
American Locomotive Co.	$6,984	$10,408	$6,485	$4,062	−33	+ 8	+ 72
Lancaster Iron Works, Inc.	216	223	196	143	− 3	+ 10	+ 51
Struthers Wells-Titusville Corp.	1,184	1,486	1,206	937	−20	− 2	+ 26
Baldwin Locomotive Works	6,007	13,760	5,702	2,567	−56	+ 5	+134
Union Tank Car Co.	738	1,042	947	963	−29	− 22	− 23
Total Tanks	**$15,129**	**$26,919**	**$14,536**	**$8,672**	**−44**	**+ 4**	**+ 74**

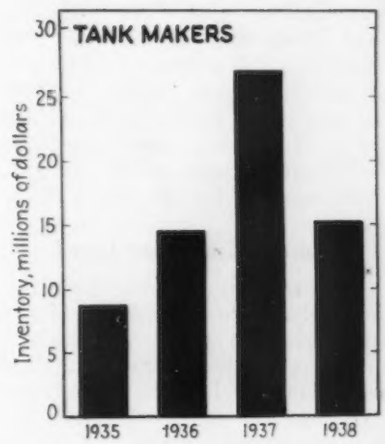
Steel Consuming Companies

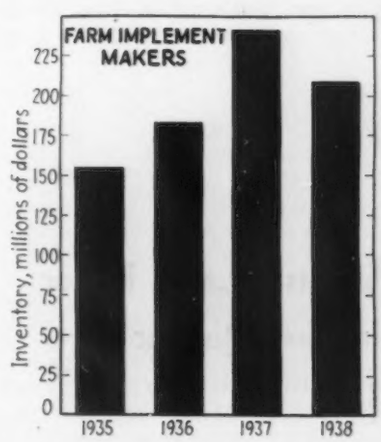
Dec. 31 unless otherwise noted)

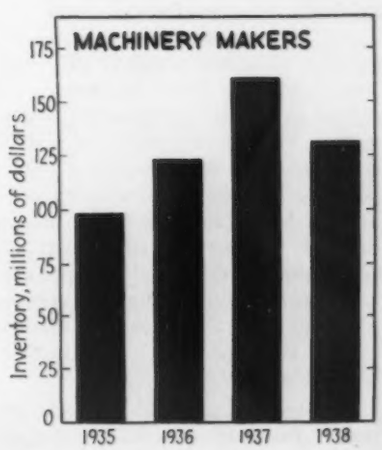
	Total Inventory				Per Cent Change 1938 From		
FARM IMPLEMENT	**1938**	**1937**	**1936**	**1935**	**1937**	**1936**	**1935**
(2) J. I. Case Co.	$20,411	$14,745	$13,184	$12,561	+38	+ 55	+ 63
(3) Massey, Harris Co., Ltd.	13,175	13,456	10,695	8,896	− 2	+ 23	+ 47
(2) International Harvester Co.	123,891	155,916	116,829	97,244	−21	+ 6	+ 26
(2) Deere & Co.	22,316	23,903	18,102	16,752	− 7	+ 23	+ 33
(3) Hart, Carter Co.	522	547	461	436	− 5	+ 13	+ 20
(1) Gleaner Harvester Corp.	702	412	195	204	+70	+260	+242
Caterpillar Tractor Co.	18,317	22,760	16,670	12,179	−19	+ 10	+ 50
Minneapolis-Moline Power Implement Co.	8,594	7,644	5,804	4,575	+12	+ 48	+ 88
(1) Cleveland Tractor Co.	1,570	2,206	1,742	1,634	−29	− 10	− 4
Total Farm Implement	**$209,498**	**$241,589**	**$183,682**	**$155,481**	**−13**	**+ 14**	**+ 35**
MACHINERY							
(3) Pneumatic Scale Corp., Ltd.	$478	$488	$382	$381	− 2	+ 25	+ 25
Link-Belt Co.	3,879	5,102	4,117	2,949	−16	− 6	+ 31
Jeffrey Mfg. Co.	2,875	3,929	3,315	2,327	−17	− 13	+ 24
Chicago Rivet & Machine Co.	182	187	154	115	− 3	+ 18	+ 58
Bullard Co.	1,263	1,530	1,089	1,254	−18	+ 16	0
Niles-Bement-Pond Co.	3,648	4,129	2,969	2,581	−12	+ 23	+ 41
Millers Falls Co.	923	1,132	1,053	935	−18	− 12	− 1
Ex-Cell-O Corp.	707	765	511	556	− 7	+ 38	+ 28
Mesta Machine Co.	1,930	2,628	1,813	1,146	−27	+ 6	+ 69
Continental Roll & Steel Foundry Co.	1,299	2,087	1,286	1,043	−38	+ 1	+ 25
United Engineering & Foundry Co.	2,489	4,571	3,629	3,184	−46	− 31	− 22
(1) York Ice Machinery Corp.	4,602	4,422	2,858	2,760	+ 4	+ 61	+ 67
Chicago Pneumatic Tool Co.	7,452	8,023	6,908	6,800	− 7	+ 8	+ 10
International Business Machines Corp.	2,722	2,648	2,153	2,028	+ 3	+ 27	+ 34
Iron Fireman Mfg. Co.	1,104	1,060	765	511	+ 4	+ 45	+116
Foote Bros. Gear & Mach. Co.	292	367	292	309	−20	0	− 5
Bliss & Laughlin, Inc.	723	951	833	682	−24	− 13	+ 6
Bucyrus Erie Co.	5,011	5,314	4,661	3,482	− 6	+ 8	+ 44
Fairbanks, Morse & Co.	7,417	9,607	7,204	5,674	−23	+ 3	+ 31
Cleveland Automatic Machine Co.	430	569	547	802	−26	− 21	− 46
Allis-Chalmers Mfg. Co.	25,302	36,724	20,454	14,808	−31	+ 23	+ 71
Marion Steam Shovel Co.	2,255	3,114	2,509	1,833	−28	− 10	+ 23
Bridgeport Machine Co.	1,892	2,044	1,610	1,076	− 7	+ 18	+ 76
General Machinery Corp.	2,215	1,879	1,579	1,391	+18	+ 40	+ 59
Wellman Engineering Co.	239	264	288	201	− 9	− 17	+ 19
Ingersoll Rand Co.	10,656	13,161	11,057	9,714	−19	− 4	+ 10
Weston Electrical Instrument Corp.	1,031	1,396	1,187	1,047	−26	− 13	− 2
Westinghouse Air Brake Co.	8,878	9,415	8,551	7,518	− 6	+ 4	+ 18
Blaw-Knox Co.	2,126	2,639	2,319	2,014	−19	− 8	+ 6
Harnischfeger Corp.	2,770	3,338	2,784	2,538	−17	0	+ 9
Cutler Hammer, Inc.	1,758	2,630	2,185	2,167	−33	− 20	− 19
Babcock & Wilcox Co.	5,412	6,689	6,539	3,859	−19	− 17	+ 40
Chain Belt Co.	1,261	1,542	1,539	1,154	−18	− 18	+ 9
Amer. Machine & Foundry Co.	2,050	2,113	1,762	1,165	− 3	+ 16	+ 81
Amer. Laundry Machinery Co.	3,204	3,610	2,566	2,155	−11	+ 25	+ 48
National Acme Co.	3,016	3,114	2,604	2,258	− 3	+ 16	+ 33
Combustion Engineering Co., Inc.	2,391	3,508	2,560	1,560	−33	− 7	+ 53
Food Machinery Corp.	3,027	3,369	2,669	2,099	−10	+ 13	+ 44
Total Machinery	**$128,909**	**$160,058**	**$121,292**	**$98,076**	**−19**	**+ 6**	**+ 31**
MISCELLANEOUS CONSUMERS							
R. C. Mahon Co.	$1,310	$811	$816	$937	+62	+ 61	+ 40
Mississippi Valley Structural Steel Co.	324	569	442	352	−43	− 27	− 8
Kansas City Structural Steel Co.	275	578	370	217	−52	− 26	+ 27
Youngstown Steel Door Co.	446	730	782	493	−39	− 43	− 9
Remington Arms Co., Inc.	6,664	7,442	6,105	5,058	−10	+ 9	+ 32
Lima Locomotive Works, Inc.	2,085	2,705	2,331	1,717	−23	− 11	+ 21
Total Miscellaneous	**$11,104**	**$12,835**	**$10,846**	**$8,774**	**−13**	**+ 2**	**+ 27**
Summary 101 Companies	**$913,588**	**$1,185,805**	**$912,219**	**$758,543**	**−23**	**0**	**+ 20**

(1) Inventory as of Sept. 30. (2) Inventory as of Oct. 31. (3) Inventory as of Nov. 30.









ucts in a big way when and if real recovery begins.

An analysis of 38 manufacturers of various types of machinery indicates that inventories at the end of 1938 had been reduced 19 per cent from 1937, were 6 per cent higher than in 1936, and 31 per cent greater than in 1935, indicating close control over inventories since sales of various kinds of machinery have held up to a greater extent than some other lines of business during the past year and a half. Despite the wide variety of machine manufacturers represented in this group, there has been an unusual consistency in the reduction in inventories from 1937 to 1938. There is, however, a wide diversification when 1938 inventories are compared with those on hand at the end of 1936 and 1935, but here again quick conclusions cannot be drawn since specific conditions undoubtedly existed, which would entirely account for the many differences.

Larger Consumers Listed

Although this study by THE IRON AGE utilized the dollar value of total inventories, an effort was made to include only those companies which were substantial users of iron and steel products and to eliminate various classifications which, as a rule, do not carry important steel inventories but which place orders for steel products only when they themselves receive business. In this category would come shipbuilders, freight car manufacturers, fabricating shops, etc.

Interesting is the fact that 93 per cent of the 101 steel consuming companies showed a reduction in inventories at the end of 1938 from 1937; 48 per cent had less inventories in 1938 than in 1936; while 24 per cent had less inventories in 1938 than in 1935. Although the inventories of these 101 steel consuming companies represent raw materials and supplies in addition to strictly steel products, the nature of the companies' business seems to warrant the opinion that the trend in actual steel inventories would be similar to that for total inventories. This contention is somewhat strengthened by a brief review of the steel price and production situation from the latter part of 1936 to the end of 1938.

Steel prices were advanced for the last quarter of 1936 which resulted in a substantial pickup in steel business prior to the 1936 inventory period. A further advance in steel prices for the first quarter of 1937 was announced before the end of 1936 which resulted in additional buying by customers in order to avoid higher prices. In March, 1937, substantial price advances for the second quarter of 1937 were announced and another general rush to cover on steel requirements before the increase became effective was made by consumers. Shipments on much of this tonnage were staggered somewhat and the situation from an inventory standpoint was substantially accentuated when the recent recession began during the latter part of 1937.

One of the major reasons for the sharp drop in steel production and in sales of steel products during the latter part of 1937 and early part of 1938 was the concerted drive by steel consumers to reduce their relatively unwieldy inventories. There is evidence that current inventories are not only well balanced with current requirements, but in many cases have been reduced to the point where were it not for the prompt delivery obtainable from steel companies, embarrassing situations might arise. It is axiomatic that during times of subnormal demand, steel companies with their vast capacities actually act as warehouses for many of their customers. On the other hand, when general business activity has reached the point where prompt delivery cannot be made because of the tremendous increase in steel demand, steel consumers as a rule are more apt to make forward commitments and carry substantial stocks in their own plant or warehouses so as not to interrupt their own line of production.

Sheets a Large Factor In First Quarter Steel

PRODUCTION of steel sheets, totaling 1,653,867 gross tons, constituted more than 23 per cent of total finished and semi-finished steel produced for sale during the first quarter, according to a report of the American Iron and Steel Institute. The output of sheets (all grades) in that quarter represented 60.1 per cent of the industry's sheet capacity. On a percentage basis, this was exceeded only by black plate, of which production was 69.4 per cent of capacity, and cold reduced tin plate at 63.8 per cent. Other products exceeding 50 per cent were wire (51.7 per cent), nails and staples (54,5 per cent), and mechanical tubing (50.7 per cent).

The total of all steel products produced for sale was 7,118,981 gross tons, of which 691,310 tons was sold to members of the industry for further conversion, leaving 6,427,671 tons, which represented 53.6 per cent of the industry's rolling capacity.

A reproduction of the complete table appears on the opposite page.

Forging Handbook Published by A.S.M.

THE American Society of Metals, 7016 Euclid Avenue, Cleveland, has published a 636-page handboook which contains a wealth of information on the processes and developments of the forging industry. The book, written by Waldemar Naujoks and Donald C. Fabel, contains over 400 photographs, detail sketches, tables and graphs on every phase of forging plant operation and production routine. The book brings up to date much information that was previously scattered in technical journals, pamphlets and individual experience and should prove very useful both as a reference book and as a source of new information. Particularly interesting sections of the book are those devoted to dies and tools, finishing equipment, heat treatment, testing and inspecting, materials, furnace design and the design of forged parts. Copies of the book may be obtained from the society at $7.50 a copy.

Monsanto Chemical Co., St. Louis, has acquired the Resinox Corp., New York, third largest maker of phenolic plastics molding compounds. Resinox products are used in automotive parts, electrical, container closure, radio, appliance, costume jewelry, cosmetic, timepiece and photographic industries. Manufacturing and research facilities of Resinox are located at Edgewater, N. J. Charles Lichtenberg will continue in charge of Resinox sales.

Ulen & Co., New York, engineers and constructors, have opened a Chicago office in the Field Building. Vern E. Alden, vice-president, and until recently with Stone & Webster Engineering Corp., will be in charge.

American Iron and Steel Institute's Report of Steel Produced in First Quarter

		Number of companies	Items	Annual Capacity Gross tons	Production for Sale—Gross Tons				
					Current Quarter				
					Total	Per cent of capacity	Shipments		Total
							Export	To members of the industry for conversion into further finished products	
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	29	1	x x x x x x x	618,075	x x x	18,472	392,627	
	Heavy structural shapes	8	2	4,691,800	458,920	39.1	15,791	-	
	Steel piling	3	3	234,300	28,423	48.5	918	-	
	Plates—Sheared and Universal	18	4	5,843,310	490,718	33.6	39,799	2,555	
	Skelp	7	5	x x x x x x x	87,885	x x x	715	66,889	
	Rails—Standard (over 60 lbs.)	4	6	3,395,300	269,761	31.8	3,478	-	
	Light (60 lbs. and under)	6	7	418,500	19,599	18.7	5,310	-	
	All other (Incl. girder, guard, etc.)	2	8	105,000	3,889	14.8	952	-	
	Splice bar and tie plates	14	9	1,290,550	96,460	29.9	1,415	-	
	Bars—Merchant	34	10	x x x x x x x	671,558	x x x	17,863	71,190	
	Concrete reinforcing—New billet	13	11	x x x x x x x	178,089	x x x	12,999	-	
	Rerolling	18	12	x x x x x x x	31,311	x x x	2,665	-	
	Cold finished—Carbon	18	13	x x x x x x x	113,798	x x x	1,523	-	
	Alloy—Hot rolled	14	14	x x x x x x x	152,515	x x x	5,663	11,950	
	Cold finished	14	15	x x x x x x x	13,574	x x x	82	-	
	Hoops and baling bands	4	16	x x x x x x x	12,015	x x x	183	-	
	TOTAL BARS	53	17	11,548,720	1,172,860	40.6	40,978	83,140	
	Tool steel bars (rolled and forged)	14	18	94,160	7,865	33.4	672	-	
	Pipe and tube—B. W.	15	19	1,728,800	166,384	38.5	6,395	-	
	L. W.	11	20	1,428,380	64,240	18.0	1,682	-	
	Electric weld	4	21	615,000	28,963	18.8	1,150	-	
	Seamless	15	22	2,994,900	298,836	39.9	16,014	-	
	Conduit	6	23	153,670	13,267	34.5	448	-	
	Mechanical Tubing	5	24	182,300	23,121	50.7	806	-	
	Wire rods	18	25	x x x x x x x	145,012	x x x	4,499	48,019	
	Wire—Drawn	38	26	1,967,535	254,289	51.7	13,652	3,826	
	Nails and staples	17	27	1,080,760	147,304	54.5	4,872	-	
	Barbed and twisted	16	28	428,075	49,747	46.5	7,845	-	
	Woven wire fence	15	29	695,330	68,713	39.5	390	-	
	Bale ties	11	30	110,680	8,284	29.9	21	-	
	All other wire products	5	31	24,380	1,093	17.9	5	-	
	Fence posts	12	32	134,700	12,623	37.5	286	-	
	Black plate	12	33	462,815	80,307	69.4	1,024	29,997	
	Tin plate—Hot rolled	11	34	1,585,360	122,195	30.8	22,038	-	
	Cold reduced	10	35	1,878,200	299,704	63.8	21,581	-	
	Sheets—Hot rolled	24	36	x x x x x x x	869,627	x x x	53,725	29,729	
	Galvanized	16	37	x x x x x x x	275,052	x x x	20,958	-	
	Cold rolled	17	38	x x x x x x x	409,856	x x x	39,533	-	
	All other	15	39	x x x x x x x	99,332	x x x	4,132	-	
	TOTAL SHEETS	26	40	11,015,965	1,653,867	60.1	118,348	29,729	
	Strip—Hot rolled	23	41	3,074,300	242,728	31.6	7,267	34,528	
	Cold rolled	35	42	1,095,910	124,862	45.6	2,508	-	
	Wheels (car, rolled steel)	5	43	380,320	25,917	27.3	525	-	
	Axles	5	44	425,900	9,221	8.7	802	-	
	Track spikes	11	45	302,350	21,690	28.7	496	-	
	All other	3	46	8,550	2,159	101.0	27	-	
	TOTAL STEEL PRODUCTS	134	47	x x x x x x x	7,118,981	x x x	361,181	691,310	
	Estimated total steel finishing capacity based on a yield from ingots of 70.0%	-	48	47,975,000	x x x x x x x	53.6	x x x x x	x x x x x x x	x x x x x x x
	Pig iron, ferro manganese and spiegel	28	49	x x x x x x x	892,540	x x x	7,765	184,391	
	Ingot moulds	4	50	x x x x x x x	67,467	x x x	-	-	
Iron Products	Bars	9	51	147,200	6,875	18.7	29	434	
	Pipe and tubes	3	52	97,730	9,047	37.0	132	-	
	All other	2	53	63,560	2,621	16.5	488	955	
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	250,530	18,543	29.6	649	1,389	

Total number of companies included - 155

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products Current quarter 6,427,671 *G.T.;* 53.6 *% of Finishing Capacity.*

To date _____ *G.T.;* _____ *% of Finishing Capacity.*

The above tonnages represent 70.0 *% of the ingots produced by companies whose products are included above.*

Cincinnati Will Be Host to

MARSHALL POST

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., national president of A.F.A.

A PROGRAM of unusual interest has been developed for the 43rd annual convention of the American Foundrymen's Association, which will be held in Cincinnati from May 15 to 18. This year there will be no equipment exhibit held in connection with the meeting and a greater amount of time than usual will be given to the technical and foundry practice sessions. Close to 40 meetings have been scheduled, many covering subjects new to A.F.A. gatherings, such as a session on the castability of metals, a symposium on steel melting practices and a four-session lecture on elementary metallurgy and the use of the microscope. Convention headquarters and registration will be at the Hotel Gibson. This hotel, together with the Netherland Plaza, will be the scene of the technical sessions, round table luncheons, etc.

The complete program of the convention follows:

MONDAY—MAY 15

A.M. 10:00 Opening Session

Presiding, President Marshall Post.
Address of Welcome
President's Address

10:30 Malleable Cast Iron

Chairman, J. H. Lansing, Malleable Founders' Society, Cleveland.
Atmospheres for Malleable Iron Annealing — Their Properties and Applications, by John Dow, Holcroft & Co., Detroit.
White Iron for Malleablizing, by J. O. Klein, Texas Foundries, Inc., Lufkin, Tex.
The Shearing of Malleable Iron Gates, by S. D. Martin, Saginaw, Malleable Iron Division, General Motors Corp., Saginaw, Mich.

10:30 Non-Ferrous

Chairman, William M. Ball, Jr., Edna Brass Mfg. Co., Cincinnati.
Co-Chairman, C. O. Thieme, H. Kramer & Co., Chicago.
Production of Bronze Pressure Castings, by D. Frank O'Connor, Walworth Co., Boston.
Crucible Melting, by G. K. Eggleston, Detroit Lubricator Co., Detroit.

10:30 Gray Iron Shop Course—First Session

Chairman, R. F. Hine, Studebaker Corp., South Bend, Ind.
Cupola Practice.
Discussion Leader, Donald J. Reese, International Nickel Co., New York.

P.M. 2:00

Visit to Cincinnati Milling Machine Co.

6:30 Malleable Dinner Conference

Chairman, L. N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala.
Co-Chairman, P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill.

8:00 Materials Handling

Chairman, E. W. Beach, Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.
Co-Chairman, James Thomson, Continental Roll & Steel Foundry Co., East Chicago, Ind.
Mold Equipment, by W. R. Jennings, John Deere Tractor Co., Waterloo, Iowa
Some Tests on the Effectiveness of Water Under High Pressure for Cleaning Castings, by R. Webster, Hydroblast Co., Chicago.

8:00 Non-Ferrous

Chairman, Harold J. Roast, Canadian Bronze Co., Montreal, Canada.
Co-Chairman, Wm. J. Laird, Westinghouse Electric & Mfg. Co., East Pittsburgh.
Effects of Aluminum and Antimony on the Physical Properties of Red Cast Brass, by H. B. Gardner and C. M. Saeger, Jr., Bureau of Standards, Washington.
High Conductivity Copper Castings, by A. B. Kinzel, Union Carbide & Carbon Research Laboratory, New York City.

8:00 Non-Ferrous Division Annual Meeting

8:00 Lecture Course—First Session

Chairman, H. Bornstein, Deere & Co., Moline, Ill.
The Microscope in Elementary Cast Iron Metallurgy, by R. M. Allen, Bloomfield, N. J.

TUESDAY—MAY 16

A.M. 9:00 Gray Iron Shop Course—Second Session

Chairman, P. T. Bancroft, Moline, Ill.
Production of Uniform Dense Structures in High Test and Alloy Iron Castings, by M. A. Scott, Greenlee Foundry Co., Chicago.

10:00 Malleable

Chairman, C. F. Joseph, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.
Co-Chairman, R. Schneidewind, University of Michigan, Ann Arbor, Mich.
Effects of Manganese on Second Stage Graphitization, by D. P. Forbes, Gunite Foundries, Rockford, Ill.
Hydrogen in Solid White Cast Iron, by H. A. Schwartz and G. M. Guiler, National Malleable & Steel Casting Co., Cleveland.

10:00 Gray Cast Iron

Chairman, F. J. Walls, International Nickel Co., Detroit.
Co-Chairman, W. R. Jennings, John Deere Tractor Works, Waterloo, Iowa
A Scientific Approach to a Foundry Problem, by L. A. Danse, Cadillac Motor Car Co., Detroit.
60,000 lb. Cupola Iron, by E. L. Roth, Motor Casting Co., Milwaukee.
British Gas Industry Castings, by F. Whitehouse, Newton, Chambers & Co., Ltd., Chapeltown, England. (Official Exchange Paper of Institute of British Foundrymen).

10:00 Non-Ferrous

Chairman, H. M. St. John, Crane Co., Chicago.
Co-Chairman, W. Romanoff, H. Kramer & Co., Chicago.

43rd Foundry Convention

The Foundry and Metallurgical Science, by M. G. Corson, New York.

Influence of Pouring Ladles on Quality of Red Brass, by R. W. Parsons, Ohio Brass Co., Mansfield, Ohio.

10:00 Apprentice Training

Chairman, J. E. Goss, Brown & Sharpe Mfg. Co., Providence.

Apprentice Training, by Herman K. Ewig, Cincinnati Milling Machine Co., Cincinnati.

Foundry Apprenticeship, by M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill.

P.M. 12:30 Non-Ferrous Luncheon

2:00 Safety and Hygiene

Chairman, L. C. Wilson, Reading Steel Casting Division, American Chain & Cable Co., Reading, Pa.

The Establishment of a Safety and Hygiene Program in a Small Foundry, by P. E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, Ohio.

The Open House and Public Relations, by W. H. Doerfner, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.

2:00 Castability of Metals

Chairman, W. H. Spencer, Sealed Power Corp., Muskegon, Mich.

Co-Chairman, George P. Halliwell, H. Kramer & Co., Chicago.

Castability of Cast Steel, by C. H. Lorig and E. C. Kron, Battelle Memorial Institute, Columbus, Ohio.

Effects of Superheating on the Castability and Physical Properties of Gray Iron, by N. A. Ziegler and H. W. Northrup, Crane Co., Chicago.

The Measurement of the Fluidity of Aluminum Alloys, by L. W. Eastwood, Aluminum Co. of America, Cleveland.

Malleable Iron Castability Tests, by E. J. Ash, University of Michigan, Ann Arbor, Mich.

4:00 Lecture Course—Second Session

Chairman, G. P. Phillips, International Harvester Co., Chicago.

The Microscope in Elementary Cast Iron Metallurgy, by R. M. Allen, Bloomfield, N. J.

6:00 Engineering Instructors' Dinner

Presiding—F. G. Sefing, International Nickel Co., New York.

8:00 Refractories

Chairman, E. J. Carmody, C. C. Kawin Co., Chicago.

Co-Chairman, A. H. Dierker, Ohio State University, Columbus, Ohio.

Plastic Cupola Patching, by R. E. Wilke, John Deere Tractor Co., Waterloo, Iowa.

Refractories in the Steel Foundry, by A. V. Leun, Bethlehem Steel Co., Bethlehem, Pa.

8:00 Time Study

Chairman, Frank Wartgow, American Steel Foundries, East Chicago, Ind.

Co-Chairman, H. C. Robson, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Practical Approach to Motion and Time Study, by G. J. Stegemerten, Westinghouse Electric & Mfg. Co., East Pittsburgh.

WEDNESDAY—MAY 17

A.M. 8:00 Gray Iron Shop Course—Third Session

Chairman, K. H. Priestley, Eaton-Erb Foundry Co., Vassar, Mich.

Cupola Refractories and Figuring Mixes.

Discussion Leader: J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.

9:00 Gray Iron

Chairman, James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.

Co-Chairman, W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee.

Rapid Temperature Measurements of Cast Iron with an Immersion Thermocouple, by F. Holtby, University of Minnesota, Minneapolis.

Copper-Aluminum-Silicon Alloy Additions to Cast Iron, by V. H. Schnee and T. Barlow, Battelle Memorial Institute, Columbus, Ohio.

Influence of Undercooling on the Graphite Pattern of Gray Iron, by R. Schneidewind and C. D'Amico, University of Michigan, Ann Arbor, Mich.

9:00 Foreman and Apprentice Training

Chairman, A. D. Lynch, J. I. Case Co., Racine, Wis.

Co-Chairman, V. J. Hydar, Milwaukee.

HENRY S. WASHBURN

Plainville Casting Co., Plainville, Conn., national vice-president of A.F.A.

Foundry Apprentice Training—An Essential to Foreman Training, by A. R. Luebke, Fairbanks, Morse & Co., Beloit, Wis.

A Foundryman's Approach to Foreman Training, by W. G. Conner, Jr., Walworth Co., Greensburg, Pa.

9:00 Steel

Chairman, J. W. Bolton, Lunkenheimer Co., Cincinnati.

Co-Chairman, W. C. Hartmann, Bethlehem Steel Co., Bethlehem, Pa.

High Alloy Steel Castings for Heat and Corrosion Resistance, by James Corfield, Michigan Steel Castings Co., Detroit.

Report of Committee on Impact Tests.

Report of Committee on Radiography.

Gamma-Ray Radiographic Standards of U. S. Navy for Steel Castings for Pressure Service, by N. A. Kahn, New York Navy Yard.

Copper as an Alloying Element in Some Cast Steels, by C. T. Greenidge, and C. H. Lorig, Battelle Memorial Institute, Columbus, Ohio.

9:00 Sand Research

Chairman, H. S. Washburn, Plainville Casting Co., Plainville, Conn.

Co-Chairman, W. G. Reichert, Singer Mfg. Co., Elizabeth, N. J.

Properties of Resin Bonded Cores, by Emile Pragoff, Jr., Hercules Powder Co., Wilmington, Del.

(CONCLUDED ON PAGE 90)

THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

o o o

. . . Automobile production approaches seasonal end . . . Buying shows continued downward trend . . . Ford tractor production under way with 50 scheduled for month . . . Packard price cut traced to manufacturing economies.

DETROIT—A decided leveling off of automobile sales during April, accompanied by decimated release orders for parts plants in April and May, continued absence of important steel buying and maintenance of a hand-to-mouth purchasing program in the industry, successively lower assembly totals in the last two weeks, and the failure of a spring boom to materialize—all of these things have prepared the auto industry for an early and quiet wind-up of 1939 model production. As a result—even though 1940 models will make an early appearance—there will be unusually long summer shutdowns in the auto plants. The current week will see the beginning.

Factory reports of retail sales through the end of April are appearing now and continue to sound optimistic. But percentage gains over the preceding month are reduced almost to the vanishing point. In most cases April business was almost exactly on a level with that of March. Sales continued above the level of last year, of course, and it is this point which publicity stresses most.

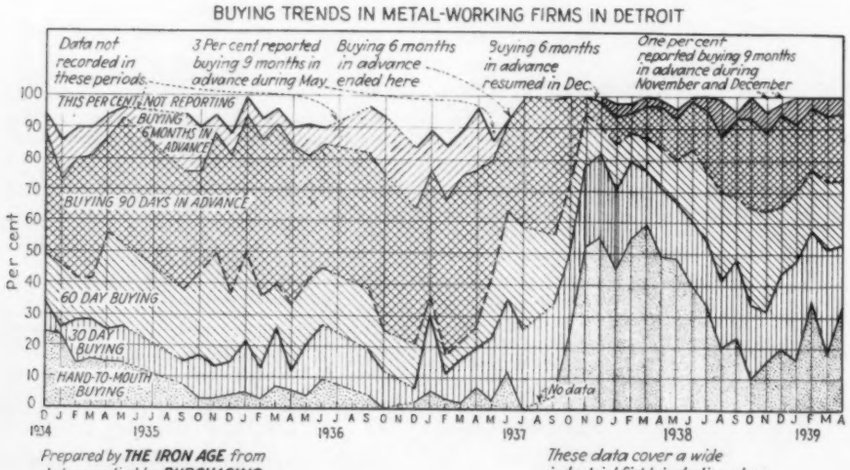
A comparison of sales so far in 1939 with production during the same period is enlightening. Chevrolet, for instance, has sold approximately 245,000 cars and trucks since Jan. 1 and has produced more than 352,000 vehicles, leaving an apparent field stock of 107,000 or more, without counting the dealer inventories which obviously were in existence at the beginning of the year. Ford, second in sales, has registered more than 215,000 vehicles, but has produced more than 340,000, an apparent difference of 124,000 cars and trucks to take care of remaining customers. Plymouth is in the best position in regard to field stocks, having an "over-production" of about 36,000 autos and commercial cars when it is estimated that output in the first four months was 163,000 and sales about 127,000. While figures are approximate in the above, the relationships are known to be true.

Despite denials that may be issued, it is known that numerous plants are on the verge of winding up production in the immediate future. Some have made plans to do so this week and others will follow suit by the end of May. General Motors plants in Flint, Pontiac and Lansing will be among the first. One of these plants was expected to finish its model year last Friday, then the closing date was set for the middle of this week. Departmental shutdowns probably will be the rule with engine lines and sub-assembly groups such as axles, suspension units, etc., shutting down in advance of final assembly lines. Plants which close earliest are expected to resume operations in the first or second week in July. Chrysler plants, again the victims of minor strikes which are upsetting schedules, have not given such definite indications of shutting down, but parts releases have long since ceased to bear much fruit for the vendors. Ford may prolong plant operations until July 1, but the total projected output of 1939 models (since the announcement date last fall) is authoritatively reported to be less than 600,000 units.

A clear indication of conditions can be garnered from the current parts releases and from the record of the last few weeks' production. Assemblies during the past week dropped sharply to 71,400 from 86,640 in the previous week, according to Ward's Automotive Reports. This total, while considerably above the 53,385 units for the corresponding week in 1938, is only about half the 1937 figure of 141,275.

Decreases were attributable primarily to Ford and Chevrolet, which reduced the work week to three and four days. A contributing factor was the fact that Chrysler was beset with minor strikes. The Ford output dropped from 21,000 to 16,500, Chevrolet from 21,500 to 15,000 and General Motors as a whole from 34,644 to

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT


Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
One per cent reported buying 9 months in advance during November and December
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
70
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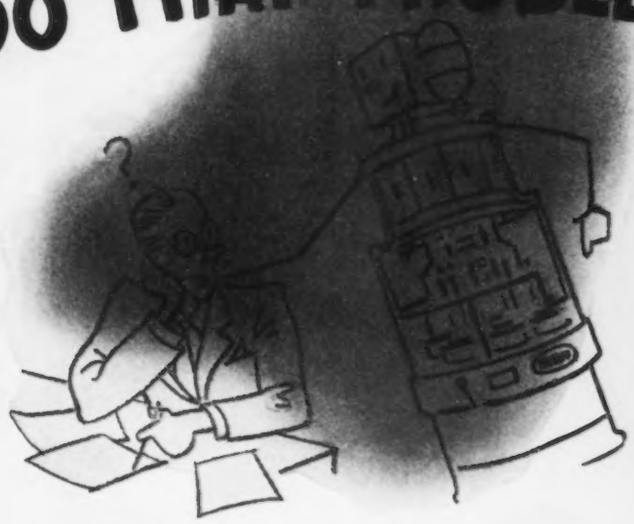
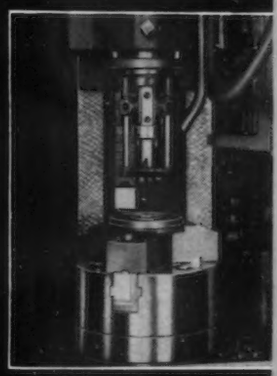
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
1934
1935
1936
1937
1938
1939

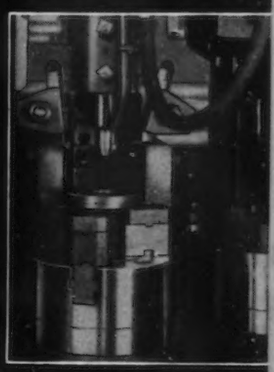
Prepared by ***THE IRON AGE*** *from data supplied by* ***PURCHASING AGENTS ASSOCIATION OF DETROIT***

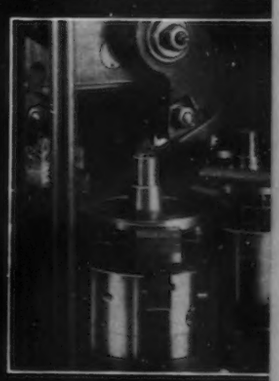
These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory and auto plants

LET ME DO THAT PROBLEM JOB









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"This factor isn't the only reason that Bullard Type "J-7" or "J-11" Mult-Au-Matics can Help You on That Problem Job, or as a matter of fact on any of your work. Ask a Bullard Engineer about other facts— Ask to have Estimates made on your work as applied to "J-7" or "J-11" Mult-Au-Matics."

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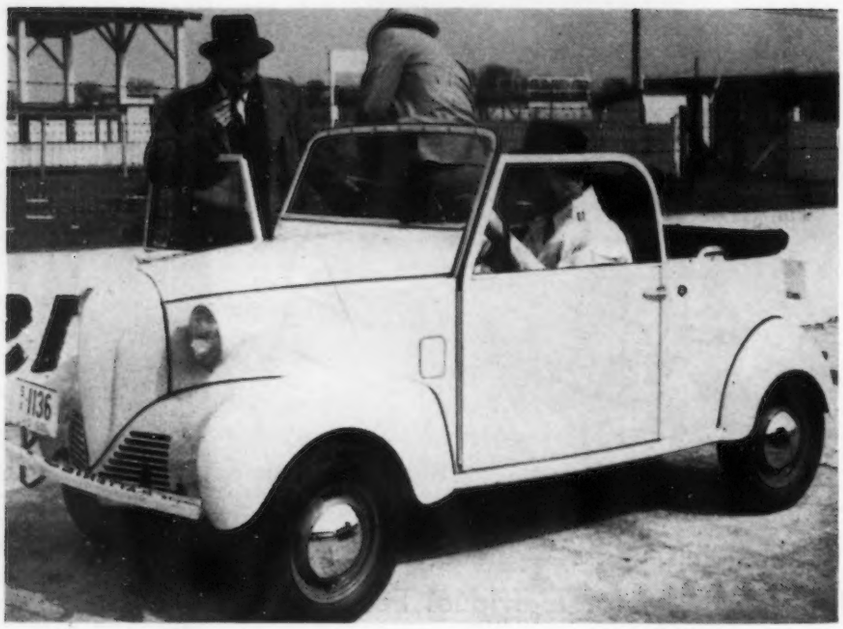

THE first new Crosley car, on its appearance at the Indianapolis Speedway, was a convertible sedan painted yellow, with red wheels. This model holds four passengers.

27,260. The Chrysler reduction from 19,325 to 17,590 found Plymouth nearly holding its own with a drop of only 100 to 8650.

Light buys of automotive steel in recent weeks and one of 5000 tons which was slated for this week have all been made with this picture of decreasing automotive production clearly in mind. The "freeze-up" which has affected buyers throughout the Detroit industrial area—and in many other industries besides automotive—is indicated clearly in the current report of purchasing trends. Hand-to-mouth buying has again increased sharply, moving upward from 19 per cent to 31 per cent, according to the Purchasing Agents Association which gathers reports from approximately 100 of the important firms in Detroit. This is practically a return to February levels when hand-to-mouth buying was practised by 36 per cent of the buyers. Buying on a 30-day schedule has decreased from 33 per cent to 22 per cent, but this has not done much to improve the outlook because all of the change was in the direction of more restriction on buying, so there actually is an increase in tight buying policy from 52 per cent in March to 53 per cent in April. (This 53 per cent includes the total of the percentages in the hand-to-mouth classification and in the 30-day range.) Roughly speaking, the status quo has been maintained for the past three months. In view of the probability of 1940 buys for automotive production, this picture may change somewhat during the current month. Steel and other materials will be placed for late summer and early fall production, at least, and this will have the effect of broadening the scope of the PA's outlook.

Incidentally, recent steel buying has brought out the fact that the new setup on quantity deductions requiring 75 tons of a kind and size to gain a deduction, has resulted in much more "concentration" of auto specifications. In other words, auto companies are now watching requirements more closely in order to get a sizable tonnage of a kind and size. And a result to steel companies is that there is less splitting of orders than formerly.

The Ford tractor program, which has been almost entirely the personal concern of Henry Ford, got underway last week at the Rouge with the assembly of the first seven production units. Previously 10 had been built by the engineering force. The schedule for May calls for 50 units, 10 each week until the final week, when it is to be stepped up to 20 units. The goal is 100 a day during June and 200 a day during July. A point which had not been made clear in any previous statements is that the tractor will not tow farm equipment behind it in the ordinary sense of the word. Instead, the plow, harrow, rake, or whatever implement is being used, will mount almost directly under the driver.

More than that, the published

(CONTINUED ON PAGE 88)

THE BULL OF THE WOODS — BY J. R. WILLIAMS

BALONEY! THERE'S MORE REAL THINKIN' DONE TODAY THAN THERE EVER WAS!
WHAT HAVE YOU GOT TO THINK ABOUT? YOUR MACHINE'S AUTOMATIC -- ART, MUSIC, MACHINERY, LITERATURE, EVERYTHING YOU MIGHT THINK ABOUT HAS ALL BEEN FIGURED OUT FER YOU -- JUST GIVE ME A NEW IDEE, JUST ONE THAT YOU CAN'T FIND IN A BOOK! WHY, THIS GENERATION IS NOTHING BUT PARROTS!
THEY'VE DONE SO MUCH TO GIVE PEOPLE MORE TIME TO THINK, THAT THEY HAVEN'T LEFT ANYTHING FOR THEM TO THINK ABOUT
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THE OLD MASTERS
J.R.WILLIAMS
5-5

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CEMENTED CARBIDE TOOLS

THIS WEEK IN WASHINGTON

. . . Some Wagner Act opponents favor avoiding showdown until 1940, letting law become an election issue . . . TNEC may subpoena 250 trade associations . . . LaFollette Committee attorney now Labor Department's wage and hour division counsel.

o o o

By L. W. MOFFETT
Washington Editor, The Iron Age

o o o

WASHINGTON—While prospects for revision of the Wagner Act at this session of Congress continued this week to hinge on the length of the current session, there were signs that new strategy is being urged by some proponents of revision who are passing the word along that by waiting until 1940 a more drastic change in the law may result from accumulated resentment against NLRB tactics and Administration failure to accept revision demands.

Failing this development, these strategists look to an injection of the AFL-CIO controversy into the 1940 elections, with a possible realinement of the AFL with the Republican Party and the CIO with the New Deal machine, to force the Wagner Act issue to a showdown. By opposing the AFL request, it is reasoned, the Administration is driving the federation into closer alinement with industry, with the result that the combined forces may appeal to the Republican convention next year where the AFL requests can be expected to be received with open arms.

Green Rebukes Lewis

Obviously, CIO Generalissimo Lewis hopes to capialize on any development which brings the AFL into agreement with business just as he did last week when he charged in a letter to the Senate Education and Labor Committee that in framing the federation amendments to the Wagner Act. the AFL received "the aid, advice and counsel of the National Association of Manufacturers and several of the most reactionary and anti-labor corporations of the country."

President William Green, of the AFL, smarting under the accusation, denied categorically that the manufacturers had been consulted before drafting the AFL amendments.

"The purpose of the Lewis letter is patent and obvious," the AFL chieftain told the committee. "It was prepared and submitted for propaganda purposes. It is filled with trickery and deception. It has nothing to do with merits of the amendments to the National Labor Relations Act sponsored by the American Federation of Labor."

Senator Thomas, chairman of the committee, who several weeks ago postponed hearings in the Wagner Act because of fears that they might interfere with AFL-CIO peace negotiations, last week denied newspaper reports that his committee had been "stalling," insisting that it was his intention to proceed as expeditiously as possible. Mr. Green asserted that the Wagner Act dispute need not necessarily be "a basis for bitterness," but conceded that NLRB activities had aggravated the split in the ranks of organized labor.

Peace Now a Memory

The current hearings have given both labor groups a chance to air their views in public and an opportunity to assail each other in a manner not possible when their representatives were conferring at "peace" negotiations several weeks ago. Some observers believe that even though labor's differences could otherwise be settled the current sessions over Wagner Act revision so accentuate the difficulties that peace prospects before the 1940 elections would be regarded as slim.

"The CIO offers the best evidence, through vicious propaganda and misrepresentation and prejudicial suggestions of their determination and desire to hold fast and maintain all the benefits and advantages which have accrued to them through the maladministration of the National Labor Relations Act by a prejudicial board," Green charged at the hearings.

"They are fighting desperately against giving up the advantages they hold and which have been accorded to them by a board which evidently has absorbed and accepted their peculiar brand of trade union and economic philosophy," he said.

The AFL president proposed during his two-day appearance, that the present three-man board labor board be displaced with a five-man board and charged that AFL membership had increased in the past four years in spite of and not because of NLRB activities. He emphasized especially the need for approving provisions contained in the Walsh-AFL amendments designed to relax present prohibitions against employer "interference," and cited a number of cases, including the Consolidated Edison case, in substantiation of his charge that the board "jumps on any pretext for the purpose of upsetting our contracts."

Bill Would Block RFC Aid to Migrating Companies

WASHINGTON — The Reconstruction Finance Corporation would be prevented from making loans to manufacturers, who plan to use the money for migration purposes, under a bill introduced in Congress last week by Senator Green, Democrat of Rhode Island.

"PLANNED LIGHTING BEFORE WE KNEW MACHINERY LAYOUT". . . *says* JOHN BURCHFIELD

Chief Electrician, Iron Fireman Manufacturing Co., Cleveland

"LIGHTING in the new section of our plant was planned before we knew what the machinery layout was to be. But we provided for a high standard of general illumination. We appreciate that good light is indispensable in the manufacture of a quality product. Good light encourages pride in workmanship, helps prevent mistakes, reduces the number of accidents."

With good general illumination in a plant, machines and benches can be arranged or rearranged for the most efficient plant operation without the outmoded question of "whether there is enough light for the job over there in the corner." As in many other leading industrial plants, the Iron Fireman Manufacturing Company uses Edison MAZDA lamps to get a high standard of illumination. For these lamps stay brighter longer, and provide more light at no additional cost for current. Use the new Edison MAZDA lamps in your plant.

Write General Electric Company, Dept. 166-IA-E, Nela Park, Cleveland, Ohio, for a free copy of a valuable new booklet, "Lighting for Production in the Factory."

300 watt Edison MAZDA *lamps in R L M dome reflectors, spaced on 11-foot centers, provide good light for safe seeing and more efficient work in the Iron Fireman Mfg. Company's plant in Cleveland.*

EDISON MAZDA LAMPS
GENERAL ELECTRIC

War Department Has Special Machine Tool, Steel Plans

WASHINGTON — Special studies had to be made of the machine tool and steel problems, Col. J. H. Burns, of the War Department, said in a discussion of "Industry's Preparation for National Defense," at the convention of the Chamber of Commerce of the United States last week. A special study also had to be made, it was stated, regarding the electrical power problem of certain raw materials and especially of those which are obtained in large part from foreign countries.

"As a result there is a special machine tool committee and plan," Colonel Burns said. "The army has been able to buy some special tools to correct the worst situations and hopes to be able to purchase increased quantities. There is also a special steel plan. The President recently appointed a National Defense Power Committee to survey this field and make necessary recommendations. There are plans for critical and strategic materials."

Over 20,000 plants, Colonel Burns stated, have been surveyed to determine which ones are of value for producing the needs of the fighting front and which products they were best qualified to make. The Army and Navy Munitions Board, it was said, has allocated some 10,000 plants to the war load on the basis of agreed-upon priorities.

Industry Must Produce More

Educational orders to the value of $2,000,000 have been placed during the current fiscal year, Colonel Burns said, and next year it is hoped to place additional orders to the extent of $32,500,000. He declared that it is quite evident that in the event of a maximum war effort, industry will have to produce more in spite of the fact that a large number of valuable production men will be called to the colors.

This means, it was pointed out, that plans must be made to provide the necessary mechanics, skilled workmen, etc., to man industry. The speaker said a special interdepartmental committee has been appointed by the President to study this problem and make recommendations.

Colonel Burns said that, while in time of peace the Army buys on a basis of competition, in time of emergency it must be able to purchase through negotiation.

"However," he said "when large scale negotiation is resorted to and the Government negotiators are in many instances novices in the field in which they are working, it is evident that special contract forms and formulae must be provided, which assure fair treatment both to the Government and to all the contractors and spur them on to more efficient effort. Such contract forms and formulae have been drawn up and are revised from time to time as conditions justify.

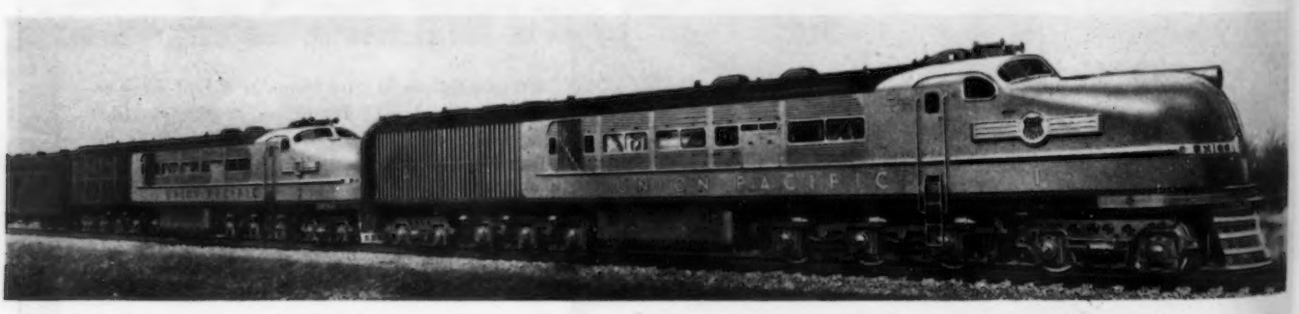
"One of the big questions in time of war is certain to be that of price control, with all that it entails, such as salaries, wages, taxes prices of materials and services, and profits. If we reduce profits to the vanishing point we force practically complete regimentation of industry. On the other hand, if we permit unreasonable prices and profits we likewise ruin the morale of the country. The Brookings Institution, at the request of the War Department, is now making a special study of this question."

Navy Supplies Bureau Distributes Contracts

WASHINGTON—The Navy Department's Bureau of Supplies and Accounts has awarded a $50,775 contract to the American Tool Works Co., Cincinnati, for one engine lathe; a $30,824 contract to the Scovill Mfg. Co., Waterbury, Conn., for seamless brass tubing; and a $28,050 contract to the Killsman Instrument Co., Inc., Elmhurst, N. Y., for aircraft altimeters and parts.

New Type Steam-Electric Locomotive Built by General Electric

GENERAL ELECTRIC'S new steam-electric locomotives recently delivered to the Union Pacific are the first to employ turbine drive of the generator. Combined power is 5000 hp. Each unit is 90 ft. 10 in. long and weighs 265 tons. The special Babcock & Wilcox boilers develop steam at 1500 lb. per sq. in. and 950 deg. F. superheat, compared with 250 lb. used in conventional steam locomotive practice. With the use of air cooled, fin type condensers, housed at the rear of each tractor unit, the overall thermal efficiency is about double that of a non-condensing piston driven engine. Firing of the fuel oil is fully automatic according to the demand upon the boiler, which is a forced circulating water tube type, with Bailey meter controls. High-speed turbine unit rotates at 12,500 r.p.m. and is geared down with a 10:1 ratio, with a lower speed unit taking the exhaust from the first. There are six driving motors on as many axles, and regenerative braking is employed to save brake shoe wear. Top speed is 125 m.p.h. In outward appearance, the locomotive resembles the new diesel-electric streamliners, with cab well up in front, in this steam type behind the water make-up tank.



In 1896 *... bicycle chains*

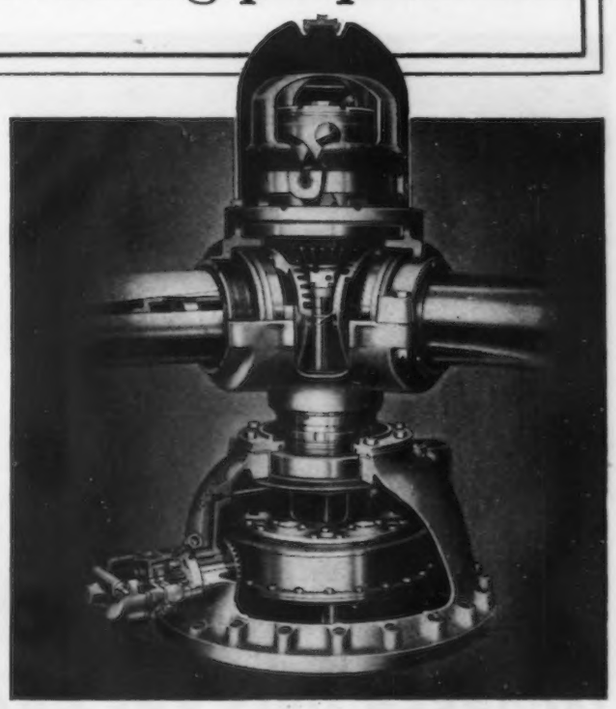
In 1939 *... feathering propellers*

Nickel made both run longer

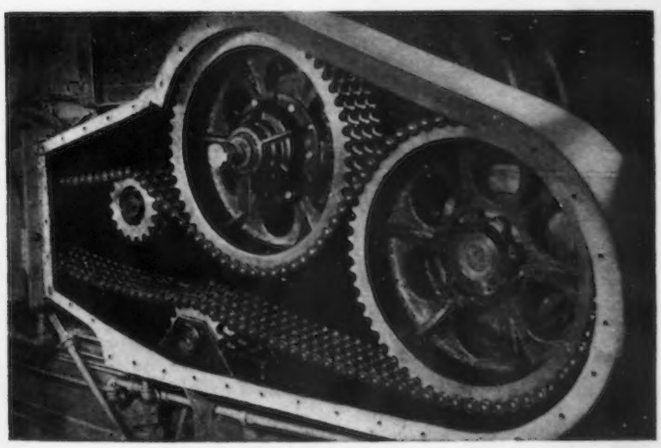
STYLES in steels change, too. Yet among the first commercial users of alloy steels, the Whitney Chain & Mfg. Co., Hartford, still depends upon Nickel alloy steel. In 1896, Whitney built bicycle sprocket chains from 5% Nickel steel. Today's Whitney roller chain industrial drives still include 5% Nickel to assure toughness and wear resistance.

1939 airliners can "shift gears" in mid-air. For this, thank Hamilton Standard engineering which produced Hydromatic feathering hubs, and modern metallurgy which provides heat treated 5% Nickel steels that withstand the stress, shock and crushing loads imposed.

For information about money-saving applications of Nickel in your industry, please write to the address below.



No drag or damage from a dead engine on a modern plane equipped with Hamilton Standard Hydromatic self-feathering propellers. Vital parts in hub mechanism are forged from SAE 2515 5% Nickel steel and SAE 4340 Nickel-chromium-molybdenum steel.



43 years of Nickel alloy steel experience is back of this Whitney roller chain. Whitney engineers use a special 5% Nickel alloy steel similar to SAE 2515 or 2520 for wear-resisting pins. Strong, shock-resisting side links are Nickel-chromium steel, SAE 3140. Rollers are SAE 3130, bushings SAE 3115 Nickel-chromium steels.

Can your trucks haul 18 tons uphill over rough ground? Euclid Trac-Truks do move such payloads at low cost because vital parts, from engine to trailer axle, are made lighter yet stronger by using Nickel alloyed materials. These uniformly tough ductile steels are heat treated to develop the most useful combination of mechanical properties for this service.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

People Must Support Cuts In Spending, Sen. Harrison Says

WASHINGTON — Climaxing the close of the 27th annual convention of the Chamber of Commerce of the United States at a dinner last Thursday, Senator Pat Harrison of Mississippi, chairman of the Finance Committee, told delegates that he believed corporation taxes would be so revised at the present session of Congress as to "encourage private industry to increase employment, add to the purchasing power of the people and stabilize the revenues of the Government."

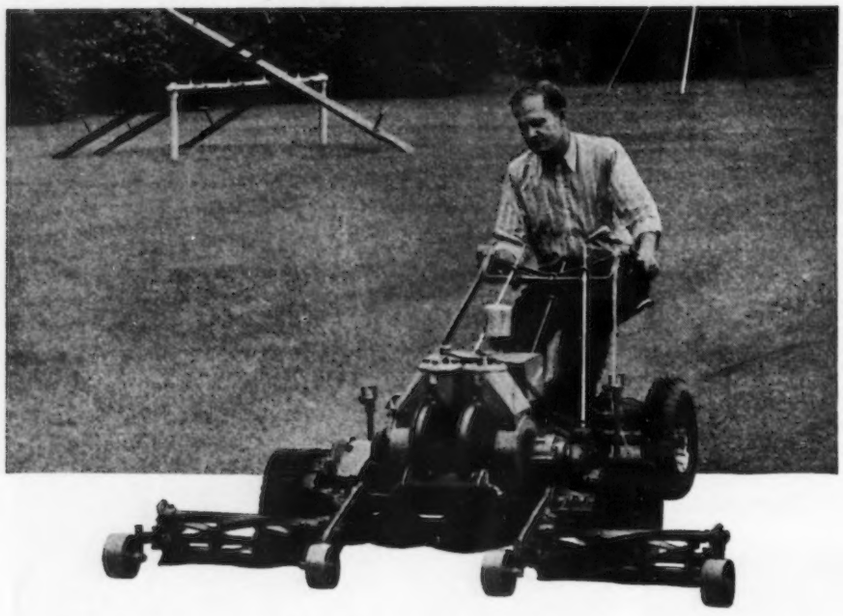
A conservative Democrat, who is at odds with the administration on its tax and spending policies, the Mississippi Senator, while offering hope of tax relief, so strongly urged throughout the Chamber meeting, took occasion, by way of good-natured banter, to remind business in effect that it should practice what it preaches if it expects results from its demands for curtailed government expenditures and reduced tax levies. Declaring that there can be no expectation of substantial relief from taxes until Federal expenditures are reduced, Senator Harrison pointedly charged business organizations sponsored by the Chamber with being one of the greatest forces for the perpetuation of the very spending policies which it had so recently condemned in formal resolution.

People's Support Needed

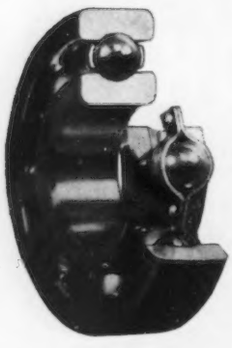
"Frankness compels me to admit that the difficult task of retrenchment in government expenditures cannot be accomplished without the active interest, encouragement and support of the citizens of this country," Senator Harrison admonished. "If economics are to be employed by this government—if expenditures are to be reduced—it will be because such a sentiment has been created back home and the demands made upon the Congress for such a policy."

The Senator warned against any expectation of a general revision of the tax structure at this time. Even as mildly optimistic as he was of early tax relief of any kind, other speakers at the convention clearly were doubtful of any relief whatever, while still others expressed fear, because of unrestrained government expenditures, that there will be further increases in taxes. This latter expression was due to the apparent indifference of the President to either tax relief or curtailment of expenditures. His statement that the administration was "officially neutral" on Congressional and Treasury plans to abolish tax deterrents to business chilled hopes for reduced levies.

The resolution on expenditures, like a group of others, struck out widely at and called for repeal or modification of New Deal legislation. Reflecting an upsurge of anti-administration sentiment, after pursuing a more moderate course the past few years, there was a dominant tone throughout this year's meeting of vigorous protest that the New Deal is stagnating business. The opinion prevailed that the attitude of the Chamber marked a permanent split with the White House. The Chamber's unfriendly feeling was undoubtedly heightened because it con-



JACOBSEN Cuts THE GRASS
BCA CUTS THE Cost



VELVET SMOOTH—that's the path this Jacobsen Heavy Duty Twin Power Mower leaves behind it. Because that's the way it runs on BCA Ball Bearings.

But there is extra "velvet" for both maker and user of Jacobsen Mowers in BCA Ball Bearings. Velvet in the reasonable first cost of these precision bearings. Velvet in their sturdy stand-up qualities which keep maintenance costs down where they belong.

All BCA Radial Ball Bearings are manufactured with the utmost care from high quality heat-treated chrome-alloy steel. Radial, thrust or angular contact, specially built or regular, there's a BCA Ball Bearing for every application. Consult our sales engineers. BEARINGS COMPANY OF AMERICA, 512 HARRISBURG AVENUE, LANCASTER, PENNA.

BCA RADIAL • ANGULAR CONTACT • THRUST **BALL BEARINGS**

sidered it had been rebuffed by the President when he said he would be unable to address it.

Offer Key to Recovery

Offering a "key to recovery" the Chamber in the course of 26 resolutions, which reflected views expressed in a multiplicity of addresses at its meeting, called for revision of tax laws, drastic curtailment of government expenditures and outright repeal of the Wage and Hour law.

The resolution on the National Labor Relations act said it should be structurally amended without delay, that an employer should be given an express right to have the Labor Board determine by secret ballot of employees the representation with which he is to deal and that employees should not be exposed to coercion from any source.

"There should be removed from the law the sanction of the closed shop, which the law not only endorses but for the accomplishment of which it provides effective procedure," the resolution said. "As the board itself has not clearly separated its activities as prosecutor, investigator and judge, Congress should provide for use by the board of independent examiners to hold hearings for fact-finding purposes. All the board's findings as to facts and all its decisions as to the law should be subject to judicial review."

Congress was urged immediately to modify the laws regulating the issuance of private securities to permit a free flow of capital into investments and to require administrative agencies to remove unnecessary restrictions from their regulations. At the same time, it was pointed out, Congress should refuse to give attention to new measures which would be detrimental to the orderly process of capital markets. Sponsoring science, invention and national progress, as offering great possibilities for enduring expansion in the volume of business and employment, the Chamber said it is essential that the present deterrents to the investment of capital and to the development of new products and processes be quickly removed. It was stated that changes in statutory and administrative regulations which are impeding the flow of risk-bearing capital into new enterprises should be immediately effected.

Carey Elected President

W. Gibson Carey, Jr., New York, president of the Yale & Towne Mfg. Co., was elected president of the Chamber. He succeeds George H. Davis of Kansas City.

At a general session on the concluding day, the future of the capital goods industries was discussed, with speakers emphasizing the necessity of the Government abandoning deficit financing, which, it was pointed out, foreshadows future taxation. President Davis of the Chamber said that if there is consistent progress the construction and capital goods industries must stand on their own feet.

Cleveland Chapter of A. F. A. to Meet May 11 To Discuss Casting Defects

CLEVELAND—The Northeastern Ohio chapter of the American Foundrymen's Association will meet at the Cleveland Athletic Club May 11 to hear Harry W. Dietert, Detroit, discuss sand control and castings defects. Officers will be elected by the chapter.

New AEROSPOT OFFERS IMPROVED MAN COOLING SERVICE

EACH PAIR OF BLADES one continuous aluminum alloy drop forging
FRONT AND REAR GUARD FACES 2" SQUARE MESH Minimum clearance 4"
SUPER SAFETY GUARD Rim mesh ½" expanded metal
HANDY RING BOLTS for carrying with crane
HEAVY STEEL STRAP SUPPORTS
BALL BEARING MOTOR FULLY ENCLOSED
ADJUSTABLE MOTOR SUPPORT
MAGNETIC STARTER
FRAME OF HEAVY WELDED STEEL TUBING
PUSH BUTTON CONTROL
STURDY ROLLED ANGLE RING BASE
SUPER SERVICE CORD AND ARMORED PLUG

Here's the newest, improved equipment for personnel cooling in sizzling hot spots. Batteries of these AEROSPOTS now in use in some of the nation's largest steel mills, foundries and metal working plants. Capacities from 3,000 C. F. M. to 26,500 C. F. M. Built to withstand the severest service. Big feature is the non-loosening, non-shatter aluminum alloy fan blades. Each pair of blades is one continuous drop forging.

Other features shown above. Quick deliveries on stock models. Free engineering counsel on special equipment for any air moving problem. Write for complete catalog.

VENTILATING SOUTH BEND EQUIPMENT

SOUTH BEND AIR PRODUCTS, INC. 304 E. COLFAX AVE. SOUTH BEND, IND.

Shortage of Steel Hampers Japanese

WASHINGTON — Shortage of steel and other metals in Japan is tending to hamper that country's extensive shipbuilding program, according to a report from Vice Consul W. C. Affeld, Jr., Kobe, made public by the Department of Commerce.

The Japanese government's concern is seen in steps to nationalize certain iron mines, introduction of a bill to subsidize production of light metals such as aluminum, and the announced intention to extend the list of products in which copper may not be used. Much publicity continues to be given in Japan to programs for the assembly of scrap metals and other normally waste products. This includes the removal of metal advertising signs along railway lines.

Plans have also been announced for exploration of mineral resources of Chosen, Taiwan, and Manchuria (Manchukuo) and much optimism is expressed as to the dormant possibilities of these areas.

Japan's requirements of iron ore this year, it is estimated, will amount to 7,500,000 tons compared with the domestic production of approximately 2,600,000 tons. Of the 5,000,000 tons of imported ore needed, not more than 1,800,000 tons can be obtained from Malaya. French Indo-China and the Philippines may supply more than formerly, but the mines in Central China, which normally supply 1,300,000 tons will probably supply much less than that amount while shipments from North China this year are not expected to exceed 1,400,000 tons. Japan is negotiating for 2,000,000 tons a year from mines in the Philippines.

Reflecting the shortage of iron and steel, the Government recently announced that it would set an example to the public in offering for sale its iron and steel articles not vitally needed, such as post boxes, manhole covers, braziers, ash trays, lamp posts and similar articles. These will be purchased through the agents of the Scrap Iron Control Co. Private individuals were urgently asked to follow the example of the Government in the disposal of unneeded iron and steel articles, according to the report.

"Engineered
TO THE JOB"
THIS 200 Ton, Single-Action Drawing Press is "Engineered to the Job" by Watson-Stillman. By designing presses for specific purposes, Watson-Stillman is able to help you attain maximum efficiency in production.
The press illustrated was designed for use in drawing cartridge cases for shells.
Presses like this—"Engineered to the Job" by Watson-Stillman—are the result of over eighty-five years devoted solely to the manufacture of hydraulic equipment.
Whenever you need it, this wealth of experience is yours. Have our engineering staff study your problems. Their recommendations will point the way to improved methods that will mean great production economies.
THE WATSON-STILLMAN CO.
107 Aldene Rd., Roselle, N. J.
WATSON STILLMAN
HYDRAULIC PRESSES FOR EVERY PURPOSE
HIGH PRESSURE PUMPS
ACCUMULATORS
HYDRO-PNEUMATIC
WEIGHTED TYPES
OPERATING VALVES
LEATHER PACKINGS
FORGED STEEL FITTINGS
W-S HYDRAULIC
WATSON-STILLMAN

La Follette Man Counsel For Wage-Hour Division

WASHINGTON—George A. McNulty, former assistant general counsel of the SEC and counsel for the LaFollette Civil Liberties Committee during its investigation of the 1937 "Little Steel" strike, has been named general counsel of the Labor Department's wage and hour division. Mr. McNulty, who has been associate general counsel of the division, succeeds Calvert Magruder, appointee to the United States Circuit Court of Appeals in New England.

$1,843,200 Shasta Contract Goes to Allis-Chalmers

WASHINGTON—The Bureau of Reclamation has awarded a $1,843,200 contract to the Allis-Chalmers Mfg. Co., of Milwaukee, for four 103,000-hp. turbines, and four governor units to be used at Shasta Dam power plant, a reclamation project in California.

TNEC May Subpoena Trade Associations

WASHINGTON — Some 250 trade associations which have failed, after a third request, to send answers to questionnaires mailed last September by Commerce Department representatives of the Temporary National Economic (anti-monopoly) Committee, are being threatened with subpoenas if the requested information is not forthcoming.

Assistant Secretary of Commerce Patterson said in a letter to the various associations that his department "had hoped that this study could be conducted entirely on a voluntary basis, and therefore will sincerely regret it if necessity compels us to proceed on a somewhat different basis."

Out of 2300 associations solicited, most responded promptly with information about their organizations, but the 250 "hold-outs" whose identities have not been disclosed, either ignored or declined the request.

Since that time, five out of the 250 trade associations have, upon advice of counsel, declined to make the necessary returns. These facts prompted Mr. Patterson to point out in his letter that, unless all returns are submitted the results of the survey will be "open to question," and that the names of the associations will no longer be kept confidential after May 15.

Navy to Have 144 Ships Under Construction

WASHINGTON — The House Appropriations Committee last week approved a $770,473,241 appropriation for the Navy for the new fiscal year beginning July 1, an increase of $142,876,047 over the current appropriation, and included funds sufficient to begin construction of 23 new ships and 500 airplanes.

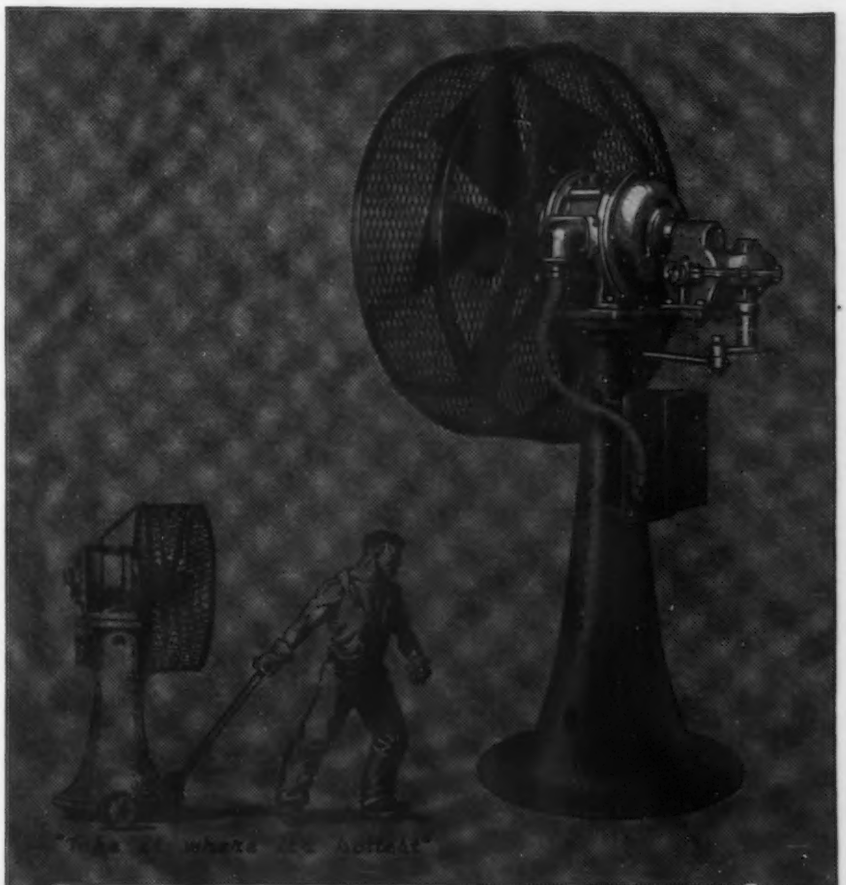
The new shipbuilding program, expected to bring to 144 the number of new ships under construction, calls for two 45,000-ton battleships, two cruisers, eight destroyers, eight submarines, two seaplane tenders and one repair ship. Estimated to require about 56,000 tons of plain steel, the ships will cost around $369,606,000. The initial appropriation recommended to begin construction amounted to $10,590,000.

However, aside from the direct appropriations recommended the bill also would empower the Navy to negotiate contracts aggregating $50,708,050. The committee reported that the Navy will have 340 surface ships operating in 1940, and that 28 will be commissioned during that year.

The committee also recommended a $46,898,000 appropriation for new aircraft and, in addition, approved contractual authorizations of $20,000,000. This is expected to give the Navy 2100 of the 3000-plane minimum already approved by Congress. It was estimated that 1454 will be in operation next year.

NLRB Again Names CIO Union Sole Bargainer

WASHINGTON—The National Labor Relations Board has recognized the CIO's United Automobile Workers Union as sole collective bargaining agency for hourly-paid production workers at the Gemmer Mfg. Co., Detroit. The certification was based upon comparison of the company's payroll with union membership cards.



Perkins Man Coolers create refreshing re-circulation of air without chilling drafts.

Perkins Man Coolers help to maintain production schedules in the hottest places.

Perkins Man Coolers decrease labor turnover and help to make contented workers.

PERKINS MAN COOLERS ARE MADE IN OSCILLATING AND STATIONARY TYPES, BOTH PORTABLE.

B. F. PERKINS & SON, INC., HOLYOKE, MASS.

Engineers and Manufacturers

PERKINS MAN COOLERS

TRADE MARK REG. U.S. PAT. OFF.

Government Steel, Machinery Orders

WASHINGTON — Government contracts, as reported by the Labor Department's Public Contracts Division for the week ended April 29, totaled $234,014 for iron and steel products; $33,134 for non-ferrous metals and alloys; and $1,803,103 for machinery. Details follow:

Iron and Steel Products

Westinghouse Electric & Mfg. Co., Essington, Pa., base rings and assembled racks	$89,545.00
U. S. Pipe & Foundry Co., Kansas City and Bessemer, Ala., water pipe	68,097.00
Bethlehem Steel Co., Bethlehem, Pa., rails, main and steady	31,160.00
Virginia Steel Co., Inc., Richmond, Va., reinforcement bars	21,725.00
Carnegie-Illinois Steel Corp., Pittsburgh, steel plates	12,319.58
Bethlehem Steel Co., Bethlehem, Pa., steel, bar, strip	Indefinite
Carnegie-Illinois Steel Corp., Pittsburgh, steel, bar, strip	Indefinite
Bethlehem Steel Co., Bethlehem, Pa., I-beams and tee-bars	11,167.60
Gem Mfg. Co., Pittsburgh, hand oilers	Indefinite
Russakov Can Co., Chicago, ammunition box assemblies	Indefinite
Pollak Mfg. Co., Arlington, N. J., ammunition box	Indefinite

Non-Ferrous Metals and Alloys

American Brass Co., Waterbury, Conn., seamless tubing, copper-nickel-alloy	$33,134.44

Machinery

Fate-Root-Heath Co., Plymouth, Ohio, tractor-mower	$11,128.00
International Harvester Co., Inc., Chicago, tractors	58,202.89
Fairbanks, Morse & Co., Seattle, Wash., engine	11,668.75
Continental Motors Corp., Detroit, air cooled engines	35,642.84
American Broach & Machine Co., Ann Arbor, Mich., broaching machine	23,493.00
Tidewater Supply Co., Inc., Norfolk, Va., machines, boring, milling and drilling	40,219.12
National Acme Co., Cleveland, spindle machine	14,983.00
Stedfast & Roulston, Inc., Boston, machining unit	12,012.00
Brown & Sharpe Mfg. Co., Providence, R. I., milling machines	37,780.00
Pomona Pump Co., Pomona, Cal., pumping units	21,400.00
Michigan Power Shovel Co., Benton Harbor, Mich., construction and road-building machinery parts	Indefinite
Singer Sewing Machine Co., New York City, sewing machines	13,852.00
Lucian Q. Moffitt, Inc., Akron, bearings, rubber-faced	12,766.30
The Ellis Drier Co., Chicago, tumblers, drying	14,475.00
R. Hoe & Co., New York City, recoil mechanisms	110,981.60
Winchester Repeating Arms Co., Division of Western Cartridge Co., New Haven, rifles	1,384,500.00

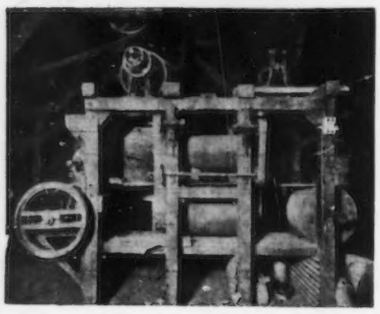
LIKE MONEY OUT OF YOUR POCKET!

OBSOLETE.. METHODS *Cut Profits*

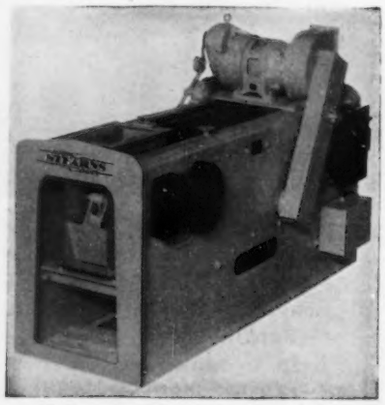
New and improved machinery and equipment are the distinguishing characteristics of industrial leadership. The owners of modernized plants are able to keep down costs, increase production, improve their product and maintain a commanding position in their trade.

It will pay you to investigate STEARNS better engineered, modern and improved magnetic separating equipment, STEARNS power transmission control devices, magnetic clutches, brakes and clutch-brake combinations. They will help provide the dollars for dividends.

THE OLD VS. THE NEW



Obsolete magnetic separators of this kind are rapidly being replaced by newer, improved types developed by Stearns engineering from forty years of research and design on magnetic equipment.



This latest improved Stearns High Duty Magnetic Separator permits treatment of bronze powder, metallic copper and similar materials for removal or reclamation of fine iron. Simple compact design, multiple magnetic zones to suit application, maximum magnetic strength, lower power input, a definitely profitable investment.

STEARNS MAGNETIC MFG. CO.

SEPARATORS DRUMS ROLLS CLUTCHES BRAKES MAGNETS

Formerly Magnetic Mfg. Co. HIGH STEARNS DUTY

LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

635 So. 28th Street *Write for Our Interesting Bulletin The House of Magnetic Magic* **Milwaukee, Wis.**

Milder Stream Pollution Bill Approved by Senate

WASHINGTON — The Senate last week voted down a stringent stream pollution control measure and approved instead the Barkley bill designed on a voluntary basis to permit private industry, the state and Federal governments to cooperate in ending water pollution.

The Barkley measure, similar to bills approved by both houses last session but subsequently vetoed by the White House because the authorizations would have by-passed the budget director, would permit expenditures of $300,000 for Federal surveys to be conducted under the direction of a stream pollution division in the Public Health Service, and authorize $700,000 to be allocated to the states for assistance in the work.

The more drastic bill, sponsored by Senator Clark, Democrat of Missouri, which was turned down by the Senate, would charge the Army Engineering Corps with responsibility for management of streams to bring about abatement of pollution. In the event manufacturers declined to cooperate, the Federal agency could go into a court of competent jurisdiction and declare a particular stream polution practice a nuisance.

. . . OBITUARY . . .

FRANK MATTHIESSEN, vice-president and director of the Columbia Tool Steel Co., Chicago Heights, Ill., and a director of the Gisholt Machine Tool Co., Madison, Wis., until his retirement in 1939, died last week in Chicago after a long illness, aged 67 years. Mr. Matthiessen had lived in Chicago since 1880 and at various times was associated with the General Electric Co., Machinists' Supply Co., and the Miehle Printing Press & Mfg. Co.

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J. ALBERT ROESCH, JR., president of Steel Sales Corp., Chicago, died suddenly last week at the Duquesne Club in Pittsburgh. Mr. Roesch, who was one of the organizers of Steel Sales Corp. in 1915, had been president of the company for about 15 years. He first started in business in 1899 with the Western Electric Co. and became associated with the steel industry in 1907. Mr. Roesch was a member of the Society of Automotive Engineers, American Iron and Steel Institute, the Illinois Manufacturers Association, and was a member of the Chicago Plan Commission. He was also a director of the Copperweld Steel Co., Glassport, Pa., and the Mercantile Trust & Savings Bank of Chicago.

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FRANK B. MCKUNE, superintendent of the open-hearth department of the Steel Co. of Canada, Hamilton, since 1899, died after a long illness at his home in that city on May 1, aged 72 years.

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JOHN B. BEALL, president, Beall Engineering & Mfg. Co., Cleveland, tank and pump manufacturer, died in Cleveland on May 3, aged 64 years.

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EDWARD CLARENCE BAILEY, associated in the management of the Milford Iron Foundry, Milford, Mass., died on May 3. Mr. Bailey was born in Goffstown, N. H., 76 years ago, and settled in Milford 50 years ago.

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THOMAS WILLIAM MURPHY, who had served as district manager for Michigan of the Youngstown Pressed Steel Co., and later as representative of United States Gypsum Co., was buried May 6 at Detroit. He was 52 years old.

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CLIFFORD LINCOLN SNYDER, 46 years old, sales engineer with the L. A. Young Spring and Wire Co., died May 2 at Detroit. Mr. Snyder attended Michigan State College and the University of Michigan from which he was graduated in 1913. During the World War he served with the field artillery. He was a member of the Society of Automotive Engineers.

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WALTER C. BUETOW, former highway engineer of Wisconsin, and more recently in charge of bridge construction for the city of Milwaukee, died May 1, aged 54 years. He was graduated from the College of Engineering of the University of Wisconsin in 1908. Mr. Buetow for several years was bridge designer and engineer for the Milwaukee Road.

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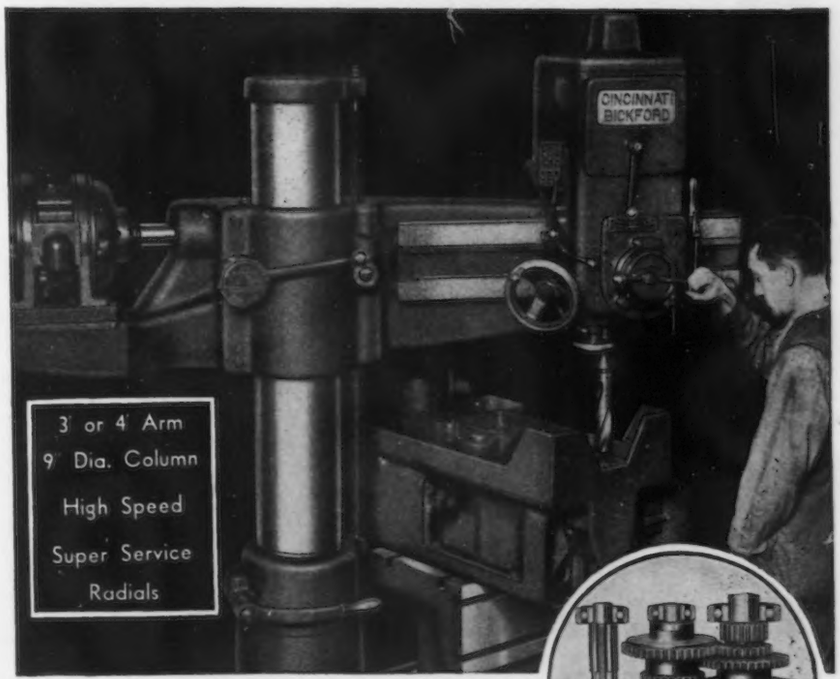
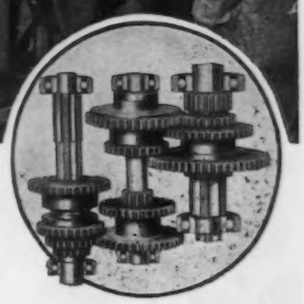
ALOIS MURAWSKY, for 39 years traffic manager of the National Enameling & Stamping Co., Milwaukee, died recently, aged 69 years. He retired last August because of illness. Mr. Murawsky was nationally known in traffic circles.





9 Spindle Speeds Only 11 Gears

Years of quiet, trouble-free, efficient operation are assured from this radial drill gear train. Nine spindle speeds are obtained with but eleven gears and at each speed there are only two gear contacts. This vital part of the Super Service Radial is noted for its compact simplicity.

Other construction features include—hardened chrome nickel steel gears, multiple splined shafts and anti-friction bearings which are automatically oiled and completely sealed against dirt.

Write for Bulletin R-21A.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

. . . PERSONALS . . .

R. B. MILDON, vice-president, formerly in charge of the East Pittsburgh division of Westinghouse Electric & Mfg. Co., moves to Pittsburgh headquarters to assume special sales assignments. Before going to East Pittsburgh in April, 1938, he was in charge of the South Philadelphia steam and stoker division. Mr. Mildon has been associated with the Westinghouse company since 1906 and has been a vice-president since 1934.

A. C. STREAMER has been appointed general manager of the East Pittsburgh division. He formerly was manager of the switchgear division and has been with the Westinghouse company since 1907.

R. B. MILDON

MELVIN PATTISON has resigned as president and treasurer of the Industrial Brownhoist Corp., Bay City, Mich., to become chairman of the board. HOYT E. HAYES, heretofore vice-president, has been elected president and treasurer. JAMES B. HAYDEN, assistant sales manager, has been made sales manager.

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G. M. STICKELL, who has been assistant sales manager of the Landis Machine Co., Waynesboro, Pa., has been promoted to the sales managership.

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WILLIAM O. LIPPMAN has been made works manager of the East Springfield, Mass., plant of the Westinghouse Electric & Mfg. Co. to succeed L. E. OSBORNE, who is elevated to manager of the manufacturing and engineering merchandising division. Mr. Lippman has been with the company since May 18, 1918, and originally located at the East Pittsburgh plant. In July, 1923, he was transferred to the East Springfield plant as chief inspector. Early in 1935, he was appointed superintendent of industrial relations; in September, 1936, was made superintendent of the fan department; later superintendent of the air conditioning department.

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WILLIAM H. ALDERDICE has been elected secretary and assistant treasurer of the Commercial Shearing & Stamping Co., Youngstown, to succeed his brother, GEORGE F. ALDERDICE, JR., who has been ill.

YOU'LL SAVE ON WELDING COSTS USING MUREX FOR SUCH JOBS
The cost of electrodes used is a very minor part of the cost of any welded structure. But, the choice of electrodes can be a major factor.
When Murex Electrodes go on the job, welding costs go down because their ease of handling and speed of operation save time and increase production.
Ask to have the Murex representative in your territory call and show you the outstanding features of these cost-cutting electrodes. At the same time, make use of his experience in shop practice, production methods, and welding procedure. Let him help solve your welding problems. No obligation is involved.
Write, also, for the pocket-size Murex pamphlet giving applications, physical properties, etc., for each electrode in the Murex line.
1 You can make real savings with Murex in fabricating heavy work such as this 90,000 lb. press crown. Users report 10% to 30% less welding time on fillets and downhand work. Photo courtesy Taylor-Winfield Corp., Detroit, Mich.
2 No need to worry about strength, soundness or ductility of Murex welds. Murex provides electrodes to meet every possible requirement along these lines. Photo of Murex-welded shovel courtesy The Osgood Company, Marion, O.
3 In making welded gears—a mass production operation—Murex steps up work: assures clean, good looking welds. Photo courtesy Shaw Box Crane & Hoist Company, Muskegon, Mich.
4 For welds subject to high pressures and temperatures, two separate Murex rods assure rapid deposition of just the right type of weld metal. Photo courtesy Columbian Steel Tank Co., Kansas City, Mo.
5 Used at higher amperages, Murex Electrodes speed welding and keep down costs—important in rush work, even more than on regular schedules. Photo of welded snow plow courtesy Carl H. Frink, Mfr., Clayton, N. Y.
MUREX
HEAVY COATED
ELECTRODES
METAL & THERMIT CORPORATION
120 Broadway, New York, N. Y.
Albany • Chicago • Pittsburgh • So. San Francisco • Toronto

A. C. STREAMER

WILFRED F. WHITE has been appointed manager of the lighting division of the Westinghouse Electric & Mfg. Co., in Cleveland, to succeed FRANK R. KOHNSTAMM, who has been made sales manager of the merchandising division of the company at Mansfield, Ohio.

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S. A. MILLIKIN, formerly treasurer, and C. H. WILLIAMSON, formerly assistant vice-president, have been elected vice-presidents of Youngstown Steel Door Co., Youngstown. W. H. ROSENBUSH, formerly assistant treasurer, has been named treasurer and assistant secretary. E. E. ROBBINS, of Chicago, has been added to the board of directors.

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STANLEY MICHAELSON, engineer in the mining division at the main works of the Allis-Chalmers Mfg. Co., Milwaukee, has been appointed sales engineer in the firm's branch office at Salt Lake City, Utah. He joined the company in 1935 to take charge of its mineral research laboratories. Previously he was on the faculty of Lehigh University mining department, specializing in the subject of ore dressing, also doing consulting work.

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DONALD B. GILLIES, vice-president, Republic Steel Corp., and president, American Institute of Mining and Metallurgical Engineers, and Mrs. Gillies, were guests of honor at a dinner dance given last week, in the grand ballroom of the Drake hotel, by the Chicago chapter of the institute. A. B. PARSONS, national secretary of the institute, and Mrs. Parsons, also were honored guests.

A luncheon was given in honor of Mr. Gillies by WILFRID SYKES, assistant to president, Inland Steel Co., and a director of the institute, who was toastmaster at the dinner dance.

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JOHN A. LEISK, superintendent of foundries and pattern shops of the Allis-Chalmers Mfg. Co., Milwaukee, on May 1 completed 50 years of service with the company and its predecessors. He started as an apprentice at 15 years of age in the old E. P. Allis Co. foundry.

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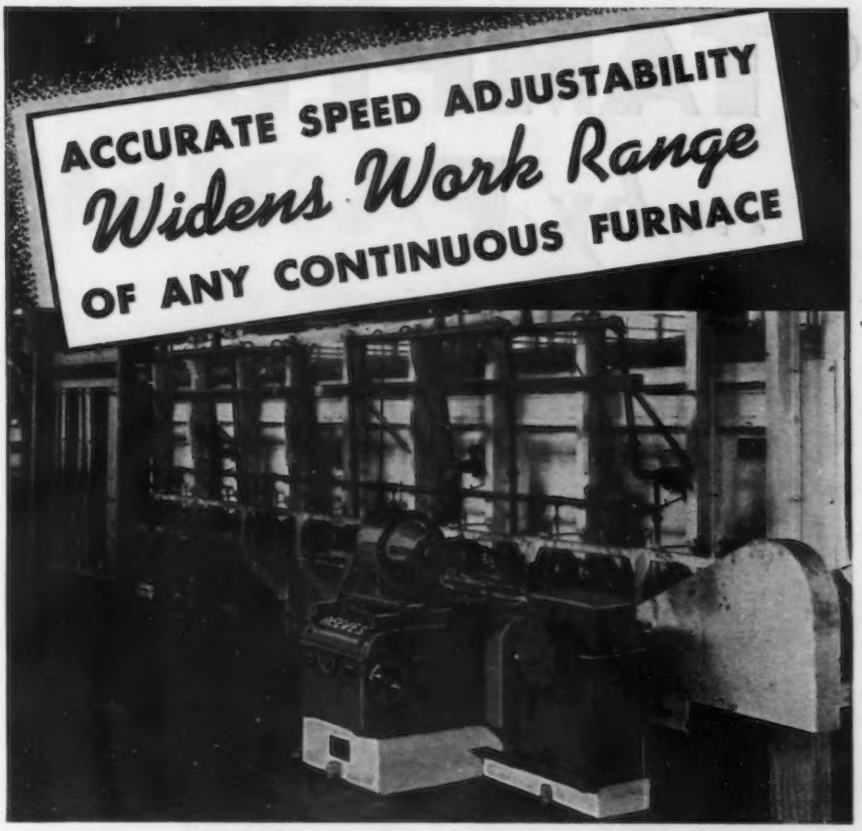
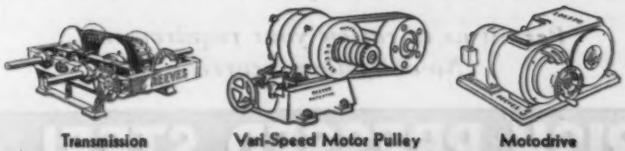
ROBERT W. CONDER was named last week director of labor relations of the Chrysler Corp. according to HERMAN L. WECKLER, vice-president. Mr. Conder has been active in negotiations be-



Seamless steel tubing—up to 40 ft. in length and in a wide range of diameters, wall thickness, and steels—is heat treated at a guaranteed rate on this Continuous Furnace. To provide necessary flexibility in operation, REEVES Variable Speed Transmissions are used to control inlet and outlet tables and furnace rollers. Speeds are varied *instantly and accurately* as required to anneal each job exactly to specifications. Guaranteed production rate has been exceeded. Any Continuous Furnace—or other driven machine—can turn out *more and better* work, when REEVES-equipped. May we make a recommendation? REEVES PULLEY CO., Dept. I, Columbus, Indiana.

THE 3 BASIC UNITS IN THE MODERN REEVES LINE



Transmission | Vari-Speed Motor Pulley | Motodrive

Reeves SPEED CONTROL

tween the corporation and its employees for the last two and one-half years and has worked with Mr. Weckler in this field.

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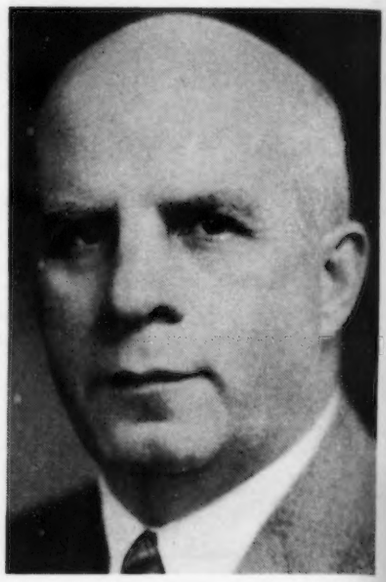
C. C. ZIEGLER, formerly Western district sales manager of the Greenfield Tap & Die Corp., Greenfield, Mass., has been elected vice-president in charge of sales, succeeding W. B. DUMONT, who has resigned. Mr. Ziegler is being succeeded in his former post by ELMER C. BRYANT, heretofore manager of the gage department. EDWARD C. BAILEY, who has been sales promotion manager, has been appointed Eastern district sales manager, with headquarters at New York, succeeding the late Charles H. Coe. GLEN STIMSON, formerly chief engineer at the Detroit plant, has been appointed gage sales manager, with headquarters at Greenfield. ELLIOTT C. PADDOCK, formerly assistant to Mr. duMont, has resigned.



C. C. ZIEGLER

H. W. WOLFF, assistant director of purchases for the Westinghouse Air Brake Co. and subsidiaries, including the Union Switch & Signal Co., has been promoted to director of purchases. He succeeds W. A. FORRESTER, who has retired after 49 years of continuous service with the Westinghouse Air Brake Co. Mr. Wolff entered the employ of the Hall Switch & Signal Co. after his graduation from a business college. In a few years he was made purchasing agent and then successively works manager, general

H. W. WOLFF

STAMPED ...by PARISH

A handsomely streamlined top casing for a household stoker, stamped out of 1/16th" hot rolled steel. Measures 33 3/8th" in length, 25 3/8th" in width, and the depth at the highest point is 7 1/2". Beauty and efficiency from one sheet of steel.

With all the svelte lines of a Paris creation, this stamping is destined to please the eye of a lady. More important to industry perhaps, it favored the purse of our customer.

Specialists in stamping, grounded in metal characteristics, we can serve you well—with style, quality and low price.

Permit us to review your requirements. No obligation incurred.

PARISH PRESSED STEEL CO.
READING, PA.
PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

manager and treasurer. When the Hall company was absorbed by the Union Switch & Signal Co. in 1925, Mr. Wolff was transferred to the latter and was made assistant director of purchases of the air brake company in 1937.

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WALTER R. OWEN, assistant purchasing agent of the Rock Island railroad for 28 years, has been named purchasing agent to succeed the late F. D. Reed. JAMES C. KIRK succeeds Mr. Owen as assistant purchasing officer, and EARL G. ROBERTS moves up into Mr. Kirk's old position. All three men have been with the Rock Island their entire careers.

MARVIN W. SMITH, who, as announced in these columns last week, has been elected a vice-president of the Westinghouse Electric & Mfg. Co.

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A. R. HERBERT, who has had a long experience in the gear and power transmission industry, has been made district manager of the newly-opened Chicago branch office, at 111 West Washington Street, of the Philadelphia Gear Works. He is a graduate in mechanical engineering of the University of Rochester, N. Y.

ROGER C. JONES has been appointed the company's representative in the lower New England territory, with headquarters in Hartford, Conn.

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STUART M. CROCKER has relinquished his duties as assistant to the executive vice-president of the General Electric Co. to become manager of the air conditioning department, which has taken over the activities of the commercial refrigeration department. Mr. Crocker has been associated with executive divisions of the company since 1921, when he was graduated from Harvard University.

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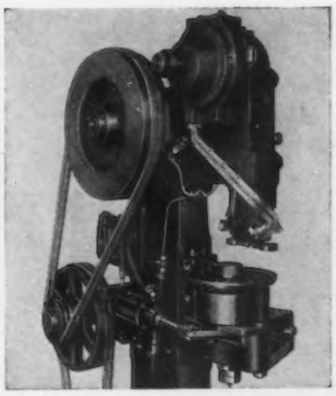
DONALD D. HOGATE, who has been in charge of the Detroit office of the department of public relations, General Motors Corp., was transferred May 1 to the staff of WILLIAM S. KNUDSEN, president, to develop inter-city communications of the General Motors Corp. FELIX F. BRUNER will succeed Mr. Hogate in charge of the Detroit office. Mr. Bruner joined the public relations office in Detroit on Jan. 1, 1937, after a newspaper career of more than 20 years. Mr. Hogate went to General Motors in April, 1934, from

the RIVITOR

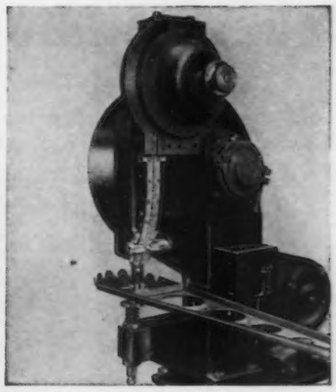
already serves these industries . . .

AUTOMOTIVE . . .



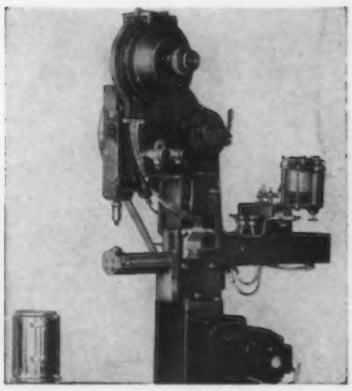
The Rivitor is shown here setting two solid rivets at a time to attach cushion springs to driven clutch plate assemblies.

AIRCRAFT . . . .



This is the standard "BR" Bench Type Rivitor tooled for setting ⅛" diameter x ¼" long duralumin rivets in airplane sections.

UTENSIL . . . . . .



The Rivitor is shown here setting aluminum rivets to attach handle brackets to bodies of percolators.

CONTAINER . .

This Rivitor sets two rivets at the same time to attach handle brackets to paint pails.

The Rivitor ably handles not only these jobs in these industries, but many jobs in these and other industries, wherever there are solid rivets to be automatically fed and set to obtain a stronger joint—better—faster.

Send for our new Bulletin R-IA. This will give you more information on the Rivitor in these industries.

THE TOMKINS-JOHNSON CO.
628 N. Mechanic Street Jackson, Michigan
Agents in principal cities in United States
European Representative—Gaston E. Marbaix, Ltd., London

Cleveland, where he was engaged in public relations work.

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WILLARD H. COBB, for the past several years general factory manager, mechanical goods plants, United States Rubber Co., New York, has been appointed general manager of the mechanical goods and general products division. HERBERT E. SMITH will continue supervision of all the activities of the divisions. Mr. Cobb is a graduate of Stevens Institute of Technology and joined the United States Rubber Co. in 1914.

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L. E. OSBORNE, who has been identified with the Westinghouse Electric & Mfg. Co. since 1910, principally in manufacturing operations, has been made manager of manufacturing and engineering in the merchandising division, Mansfield, Ohio. He was formerly superintendent of the metal stamping department at East Pittsburgh then became works manager of the meter and instrument plant at Newark and since 1934 has been works manager of the merchandising division at Springfield, Mass.

❖ ❖ ❖

J. W. SANDS has been placed in charge of the newly-established field office at 67 Wall Street, New York, of the International Nickel Co., New York. This office will cover the Central Atlantic district.

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T. E. BARLOW, who has been research engineer at Battelle Memorial Institute since 1936, has been appointed metallurgical engineer of the Copper Iron and Steel Development Association, 5005 Superior Avenue, Cleveland. He will act as technical service representative of the association of copper producers, whose aim is to direct the increasing tonnage of copper employed in iron and steel to the best advantage. He is a graduate of the University of Michigan and was previously chief metallurgist of an automotive jobbing foundry in Detroit.

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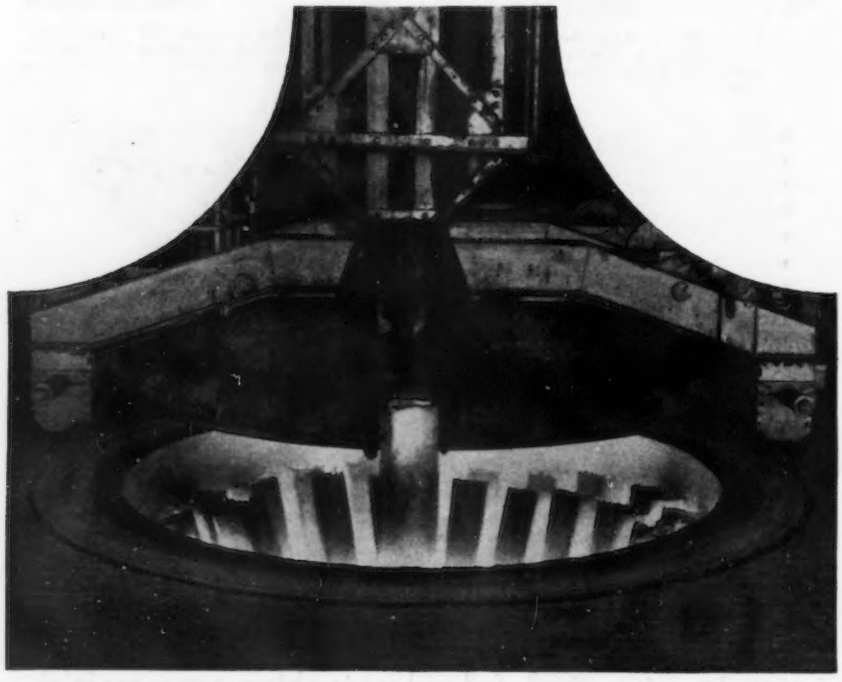
R. S. WHARTON, former sales manager of the Quaker City Rubber Co., Philadelphia, has been made vice-president in charge of sales, succeeding F. C. MILLHOFF, who has retired. G. C. JOHNSON, heretofore manager of the Chicago office, has been made general sales manager. H. C. HEINE has been made manager of the Chicago branch, with E. ASBRIDGE as his assistant.

SALEM ENGINEERING COMPANY

SALEM CIRCULAR SOAKING PITS

Capacity far greater than conventional type pits, greater control is afforded by the circular design and construction,—proved economy. Far more than merely heating units—"Salem" Circular Soaking Pits are heat treating furnaces, imparting to the ingot a splendid condition, acknowledged by the men who use them. Originated and developed by "Salem".

MAKE STEEL "RIGHT" AT THE START



SALEM, OHIO, U. S. A.

Chicago—Detroit—Pittsburgh—New York
London—Paris—Berlin—Welland, Ontario

SALEM ENGINEERING COMPANY

German Steel Workers Average 35¢ Per Hr.

STEEL workers in the United States earn from two to nine times as much money per hour as do steel workers elsewhere, according to a study by the American Iron and Steel Institute.

During 1938, wage-earning employees of the steel industry in this country earned an average of 83c. per hr. which compares with average hourly wages of 31½c. in steel mills of eight foreign countries.

Wages paid to steel workers in Great Britain averaged 40c. per hr. last year. French steel workers received an average of 38½c. per hr. in 1937. Steel workers in Germany earned an average of 35c. per hr. in 1937. Earnings of steel workers in Italy during 1938 averaged 16c. per hr., while in Japan during 1938, steel workers earned an average of about 9½c. per hr.

Weirton Structural Mill to Run by July 1

WEIRTON, W. Va. — Weirton Steel Co.'s structural mill was shut down here late last week to permit reconstruction work, the result of which will increase by more than 200 per cent this mill's potential finished tonnage, according to T. E. Millsop, president.

Part of a $5,000.000 expansion program, the new structural mill is expected to be in operation by July 1 and a substantial increase in its output is being made with but slight alterations.

In addition to all present products produced by the mill, nine entirely new items will be made and a number of present products will be rolled in a greatly increased range of sizes.

A warehouse, 110 x 528 ft., recently erected adjacent to the company's main office building, is included among the facilities of the structural mill.

New products in the structural mill will include: H beams, 4 in.—13.8 lb. to and including 8 in.—37.7 lb.; wide flange beams, sections not exceeding 21 in. in depth and 8¼ in. in flange width; car and ship building channels, 3 in.—6.5 lb. to and including 13 in.—50 lb.; car center sills, all sections; car and ship building, bulb angles, 4 in. x 3½—11.9 lb. to an including 10 in. x 3½ in.—34.7 lb.; rolled tees, 2⅜ x 2½ in.—5.1 lb. to and including 6½ x 6½ in. — 19.8 lb.; tees — split from beams, within the range of beam sections; zees, 3 in.—6.7 lb. to and including 6 in.—34.6 lb.; sheet and Z pilings, all sections.

Standard I beams will be rolled in sizes from 3 in.—5.7 lb. to and including 24 in.—120 lb., and standard channels will be rolled from 3 in.—4.1 lb. to and including 18 in.—58 lb. Both of these products are now rolled in sizes to and including 12 in.

All special sections will be rolled in the new plant within the range of the mill as in now the case and present products, such as tie plates and angles from 3 x 2 x 1⅛ in., will continue to be produced.

Cleveland Companies Exhibit in Store Windows

CLEVELAND — A number of Cleveland companies and institutions have arranged window exhibits at a downtown department store which is celebrating its 40th anniversary. Electric Controller & Mfg. Co. displays a welder at work. Republic Steel Corp. shows items used in the manufacture of steel as well as scores of stainless steel household articles. The Nela Park Division of General Electric Co. exhibits latest developments in lighting and shows progress made in the past sixty years. Addressograph-Multigraph Corp. shows working displays of office machines with a number of early models. Foote-Burt Co. has in operation a small drill press and also displays items processed on its machines. Thompson Products Co., George Worthington Co., American Shipbuilding Co., and Case School of Applied Science, are among the exhibitors.

U. S. Machinery Shipments To China Rise Sharply

WASHINGTON—Shipments of American-made metal working machinery to Kwantung, Japanese leased territory in China, were valued at $656,888 for the first quarter of this year, as compared with a value of $653,299 for the entire year of 1938.

● Increased production speed! . . . Longer tool life!—How often have these been your worries?

Cities Service Cutting Oils can help you to attain these ends because they are *Service Proved—proved in Service* by satisfying, discriminating and exacting customers—turning out not only good but superior work.

Have you a metal cutting lubrication problem? If so, our free Lubrication Engineers' Consulting Service will help you solve it. Also, if you'd like a copy of our new booklet, "Metal Cutting Lubrication—In Theory and Practice," it's yours for the asking.

This is the "Heat Prover" —an ingenious device that might be helpful to you. It's a by-product of our research in metallurgy. It registers, continuously and instantaneously, changes in the amount of oxygen and combustibles in furnace gases. Invaluable in the heat treatment of metals—assures uniformity and reduces scrap losses.

CITIES SERVICE OIL COMPANY
SIXTY WALL TOWER—Room 1626A,
NEW YORK, N. Y.

Please send me information concerning your Engineers' Lubrication Service (check box) ☐
Please let me know how I can get Heat Prover Service.....(check box) ☐
Please send me folder on Cutting Oils (check box) ☐

*Name*_____
*Address*_____
*City*_____

SERVICE PROVED INDUSTRIAL OILS

You be the Judge

OF THE QUALITY AND PERFORMANCE OF THESE SUPERIOR PRODUCTS

On any basis — strength, accuracy, uniformity — these Parker-Kalon *Cold-Forged* Products pass every test with flying colors.

But *you* be the judge of that! Test them in your own plant, in your own way, under actual operating conditions. Find out why thousands of users have switched to Parker-Kalon. Send for samples today. No obligation.

PARKER-KALON CORPORATION
200 Varick Street, New York, N. Y.

PARKER-KALON
Cold-forged
SOCKET SCREWS
WING NUTS · CAP NUTS
THUMB SCREWS

SOLD THROUGH REPUTABLE DISTRIBUTORS

Shortage of Machine Tools "Tremendous," Tell Berna Reports

CLEVELAND — The percentage of obsolescence in the nation's industrial equipment has for some time been steadily increasing, Tell Berna, general manager, National Machine Tool Builders' Association, told the Industrial Marketers of Cleveland, at a dinner at the Cleveland Athletic Club, on May 5.

"Ten years of subnormal business in most metal-working plants have created a tremendous shortage in machine tools and mechanical equipment of all kinds," said Mr. Berna, "and competent management realizes that this means excessive costs, resulting in high prices to the consumer and, in the last resolution, more unemployment."

Data quoted by the speaker showed that government arsenals and yards are using equipment of which 80 per cent is of World War age or older. "Even that is not so serious," Mr. Berna said, "for our chief reliance in an emergency is the vast capacity of our industrial plants—obsolescence there is of critical importance, whether in peace or in war."

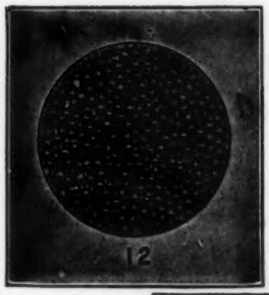
Mr. Berna further pointed out that the advertising and sales program of the industry must be based on the earnings that can be made under present business conditions by replacing obsolete equipment.

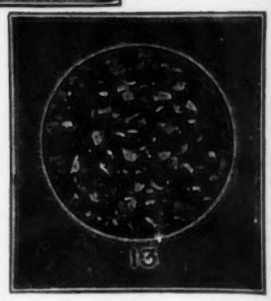
"New machine tools frequently pay for themselves in two years in the savings they make possible," he stated. "This is equtvalent to 50 per cent interest on the money invested—a far greater return than can be secured by industrialists in any other investment field."

Globe-Wernicke Offers Pre-fabricated Buildings

GLOBE-WERNICKE CO. of Cincinnati, large maker of office equipment and supplies, is offering a new type of construction that makes possible custom-built steel buildings from pre-fabricated standard units which are easily and quickly erected.

All parts may be removed, reassembled and reerected or rearranged with or without additional units, various insulating methods may be used, walls may be single or double-face, and the cost is often less than with other types of construction, J. S. Sprott, president, says.





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Since the introduction of our Heat-Treated Steel Shot And Heat-Treated Steel Grit

Consumers are saving
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15 per cent
25 per cent

Metal blasting faster.

Metal blasting cheaper.

Metal blasting with a better finish than ever before.

Our large, modern plant produces only heat-treated abrasives—uniform quality the year round.

A month's run of our shot or grit in your machine will prove the above statements.

Send us samples of the sizes you use; test our product in your own machine and save money.

A ton or a carload.

HARRISON ABRASIVE
Corporation

MANCHESTER, NEW HAMPSHIRE

We Never Compromise With Quality

Steel Taxes in 1938 18% of Net Earnings

THE total of $98,600,000 in taxes levied on the steel industry in 1938 exceeded by nearly 18 per cent the amount of net earnings remaining to the industry after all other expenses of operation had been met, according to the American Iron and Steel Institute.

By comparison, taxes in 1929 took less than 21 per cent of the steel industry's net earnings before taxes, while in 1937 taxes took 42 per cent of such earnings.

For every ton of finished steel produced during 1938, the steel industry paid a total of $5.18 in taxes, which was 78 per cent more per ton than in 1929, and 4 per cent more per ton than in 1937. Steel taxes in 1929 represented $2.91 per ton of output, while in 1937 taxes were $4.96 per ton.

Detroit A. F. A. Meeting Advanced to May 11

DETROIT—May 11 instead of May 18 will be the date of the meeting of the Detroit Chapter of the American Foundrymen's Association, it has been announced by Harry J. Deutsch, the chapter's secretary. Conflict with the dates of the association's convention in Cincinnati occasioned the change. At the May 11 meeting in the Fort Shelby Hotel, members of the chapter were to hear S. C. Massari, of the Association of Chilled Car Wheel Manufacturers, talk on "Controlled Cupola Operation" and see a thirty-minute film devoted to chilled car wheels.

Bearings Subject of Detroit A. S. T. E. Meeting

DETROIT—At a session devoted to the subject of oil impregnated bronze bearings, three technical experts from the Amplex Mfg. Co., division of Chrysler Corp., will address the Detroit chapter of the American Society of Tool Engineers, Thursday, May 11. The meeting will follow a dinner in Dodge main plant cafeteria at 6.30 p.m. The technical session, which will start at 8 o'clock, will include talks by W. J. Calkins, metallurgist, G. E. Platzer and M. Smith, engineers, on "Oilite Oil Cushion Bronze Bearings." There will be a sound motion picture "Fish from Hell," and a plant tour of the Dodge main trim shop and foundry.

...will there be Net Profits?

EVERY industrial enterprise must enjoy net profits if it is to continue to exist. ✦ Numerous steps can be taken to achieve this end. One of them is the installation of more modern machine tools—specifically grinding machines. This, we admit, is not always the solution, nor is it ever the whole solution, but it is frequently a contributing factor. ✦ Take, for example, a recent Landis 10" x 18" Type D Hydraulic installed in the plant of a connecting rod bearing manufacturer. Initial reports show that the machine is turning out 3.2 pieces to 1 on older equipment. The resulting drop in manufacturing costs, when multiplied by similar savings which could no doubt be obtained by the use of other modern equipment, would add up in the course of a year to an attractive total. ✦ The next time you are struggling with the problem of net profits, why not investigate the savings which modern Landis grinding equipment may be able to bring you?

296

PRECISION LANDIS GRINDERS

INVEST IN LANDIS

PRECISION LANDIS GRINDERS

LANDIS TOOL COMPANY, WAYNESBORO, PA.

. . . THE NEWS IN BRIEF . . .

Sheets constituted more than 23 per cent of steel produced for sale in first quarter of this year.—**Page 59.**

Automobile production approaches seasonal end. Buying shows continued downward trend. Ford tractor production under way with 50 scheduled for month. Packard price cut traced to manufacturing economies.—**Page 62.**

Senator Green's bill would prevent RFC from making loans to help companies migrate.—**Page 66.**

Wagner Act opponents may avoid showdown until 1940, some strategists look to election battle.—**Page 66.**

New type steam-electric locomotive built by General Electric.—**Page 68.**

War Department has special machine tool, steel "plans," Col. J. H. Burns declares.—**Page 68.**

Navy Department Supplies Bureau distributes contracts.—**Page 68.**

Business organizations, others must support cuts in Government spending, Senator Pat Harrison says.—**Page 70.**

Northeastern Ohio chapter of A.F.A. to hear talk, May 11, by H. W. Dietert.—**Page 71.**

LaFollette Committee attorney is now Labor Department's wage and hour division counsel.—**Page 72.**

$1,843,200 turbine contract goes to Allis-Chalmers Mfg. Co.—**Page 72.**

Shortage of steel hampers Japan's shipbuilding program.—**Page 72.**

House Committee provides funds for 23 new ships, 500 airplanes; Navy to have 144 ships under construction.—**Page 73.**

TNEC may subpoena 250 trade associations refusing to answer questionnaires.—**Page 73.**

NLRB again names CIO union a sole bargaining agent.—**Page 73.**

Milder stream pollution bill approved by Senate, drastic measure voted down.—**Page 74.**

Government steel contracts for latest reported week total $234,014.—**Page 74.**

German steel workers average 35c. per hr., American steel workers, 83c.—**Page 80.**

United States exports of metal-working machinery to China gain sharply.—**Page 81.**

Cleveland companies exhibit products in downtown store windows.—**Page 81.**

Weirton Steel Co.'s new structural mill expected to operate by July 1.—**Page 81.**

Shortage of machine tools in American industry is "tremendous," Tell Berna tells Cleveland Marketers.—**Page 82.**

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MEETINGS

May 15—Gray Iron Founders' Society, Cincinnati.

May 15 to 18—American Foundrymen's Association, Cincinnati.

May 16 and 17—American Steel Warehouse Association, Chicago.

May 22 to June 8—Society of Automotive Engineers, world congress, in various cities.

May 24 and 25—National Metal Trades Association, Chicago.

May 25—American Iron and Steel Institute, New York.

May 25 to June 1—Triple Convention (American Supply and Machinery Association, the National Supply and Machinery Distributers' Association and the Southern Supply and Machinery Distributers' Association), on board the S.S. Monarch of Bermuda.

June 5 and 6—Associated Machine Tool Dealers, Schenectady.

June 26 to 30—American Society for Testing Materials, Atlantic City, N. J.

Globe-Wernicke Co., Cincinnati, offers pre-fabricated buildings.—**Page 82.**

Steel industry's taxes for 1938 are 18 per cent of net earnings.—**Page 83.**

May 11 is substituted for May 18 as date of meeting of American Foundrymen's Association Detroit chapter.—**Page 83.**

Detroit chapter of A.S.T.E. will hear talks on oil-impregnated oil bearings.—**Page 83.**

24th annual convention of National Association of Purchasing Agents will be held May 22-25 at San Francisco.—**Page 86.**

Steel warehouse association members to hear Charles R. Hook, Armco president, at their 30th annual convention.—**Page 86.**

Chicago's first steel skyscraper, the 22-floor Capitol building, to be razed.—**Page 86.**

University of Pittsburgh installs new metallurgical laboratories.—**Page 86.**

Concrete Reinforcing Steel Institute elects directors.—**Page 87.**

Steel industry's March payroll at highest level in 16 months.—**Page 87.**

Commerce Department's "Industrial Market Data Handbook" to be published about July 1.—**Page 87.**

1000 attend welding clinic at William & Co. warehouses, Pittsburgh.—**Page 90.**

Secretary Hopkins backs New Deal's spending, censures Chamber of Commerce, says business is gaining.—**Page 91.**

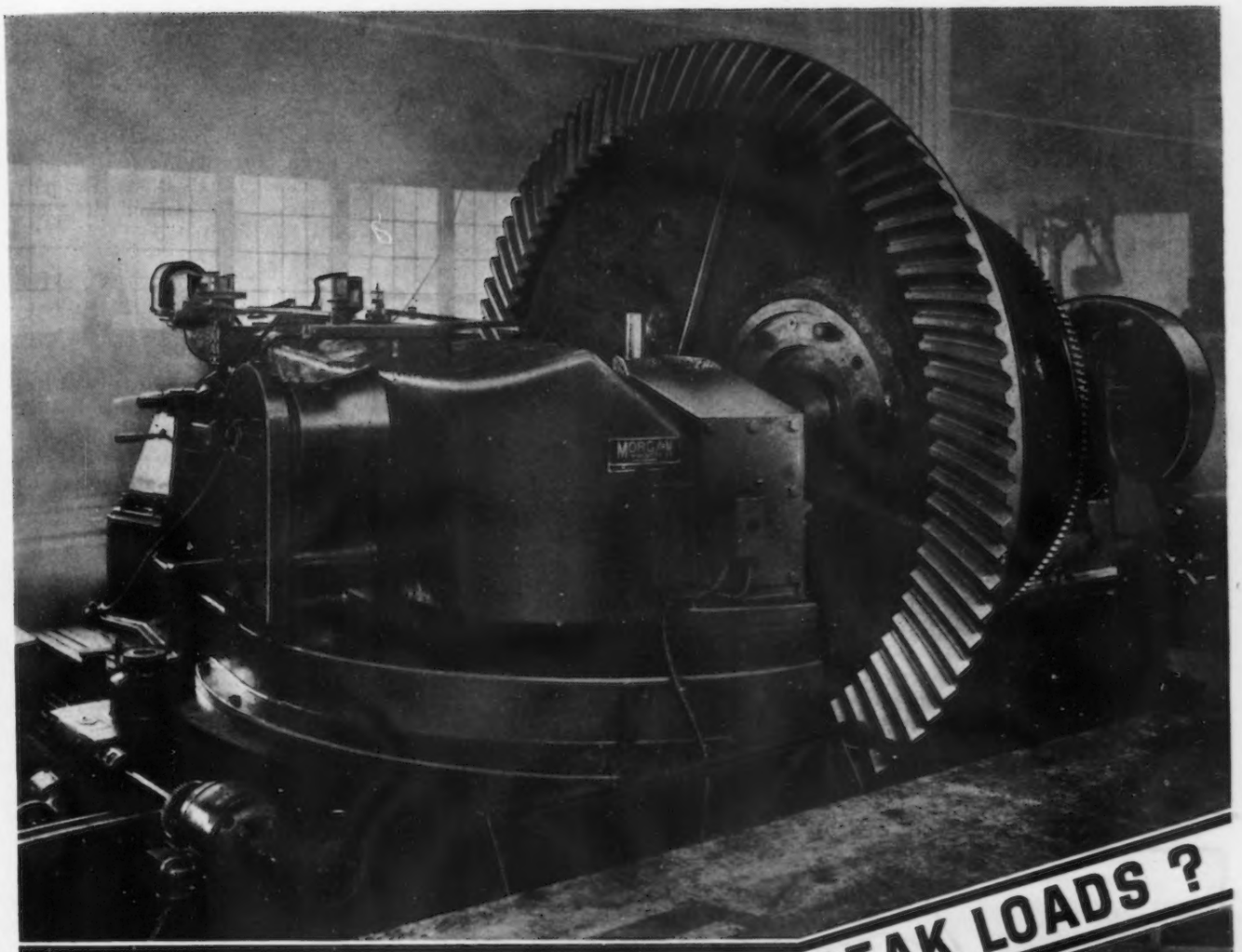
Contracts for heavy engineering awards gain 25 per cent in April.—**Page 93.**

Briggs & Stratton Corp. becomes sole licensee for sale and manufacture of Graham unit.—**Page 109.**

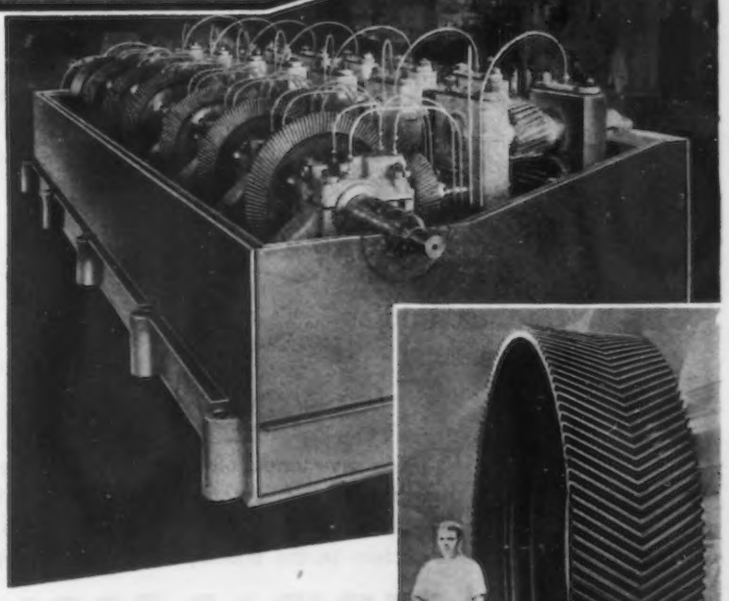
Porcelain Enamel Institute 4th annual forum to be held Oct. 18-20.—**Page 109.**

A.F.A. and Dust Control Equipment makers to pool ideas.—**Page 111.**

SWOC wins election among employees of Hubbard & Co., Pittsburgh.—**Page 111.**



CAN YOUR DRIVES HANDLE PEAK LOADS ?



Morgan Continuous Rolling Mills have always been powered for the peak loads. In 1920 Morgan engineers, recognizing the unquestioned superiority of accurately cut spiral bevels over straight spur bevels, designed and built the first spiral bevel gear planer. Its success was such that a second similar machine with even greater range was built. For capacity and range of control these machines are still unequalled. One of them is shown here putting the finishing cut on a typical Morgan Spiral Bevel Bell Gear 140.056" P.D., 88 teeth, 5" circular pitch, 13" face. The largest spiral bevel gear so far produced on this machine has a pitch diameter of 160.428", 84 teeth, 6" circular pitch and 20" face.

Can your drives handle peak loads? A Morgan Report will locate the trouble and point out the answer.

MORGAN CONSTRUCTION COMPANY
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LET MORGAN WORCESTER ENGINEERS AND MANUFACTURERS **REMOVE THE LAGS**

Steel Warehouse Association Will Hear C. R. Hook

CLEVELAND—Charles R. Hook, president, American Rolling Mill Co., Middletown, Ohio, and chairman, National Association of Manufacturers, is scheduled to speak at the banquet of the 30th annual convention of the American Steel Warehouse Association, in the Drake Hotel, Chicago, May 16 and 17.

Following a general luncheon Tuesday noon, A. Oram Fulton, president of the association and president of Wheelock, Lovejoy & Co., Inc., Cambridge, Mass., will address the members on the values of trade associations to industries. W. S. Doxsey, executive secretary of the association, will outline cost factors and market trends in the warehouse industry. J. F. Rogers, president, Beals, McCarthy & Rogers, Inc., Buffalo, chairman of the mill relations committee, will summarize the progress and objectives of the association in the distribution of hot-rolled products. The concluding address of the afternoon will be made by R. E. Desvernine, president of Crucible Steel Co. of America, N. Y.

Wednesday morning, C. M. Inman, Pratt & Inman, Worcester, Mass., will discuss fundamentals of cutting costs and various commodity committee chairmen will report.

At the Wednesday afternoon meeting Benjamin F. Bills, Benjamin F. Bills and Associates, Inc., Chicago, will analyze sales methods of the steel warehouse industry. Norman L. Deuble, Republic Steel Corp., Massillon, Ohio, will discuss customer specifications and rejections and suggest ways and means for simplifying steel sales processes. Charles Dickerson, Miami-Dickerson Steel Co., Dayton, Ohio, will comment on the relative merits of various commercial practices and policies.

A special program has been arranged for the ladies. Following the banquet a dance with floor show will be given for members and their wives and guests.

On the following day members will have an opportunity to visit the following warehouses and steel plants in the Chicago district: A. M. Castle & Co., General Steel Warehouse Co., Jones & Laughlin Steel Corp., Jos. T. Ryerson & Son, Inc., Scully Steel Products Co., Wyckoff Drawn Steel Co., all in Chicago; W. J. Holliday & Co., Hammond, Ind., Bliss & Laughlin, Inc., Harvey, Ill.; Inland Steel Co., Indiana Harbor, Ind.

Pitt Installs New Metallurgical Labs

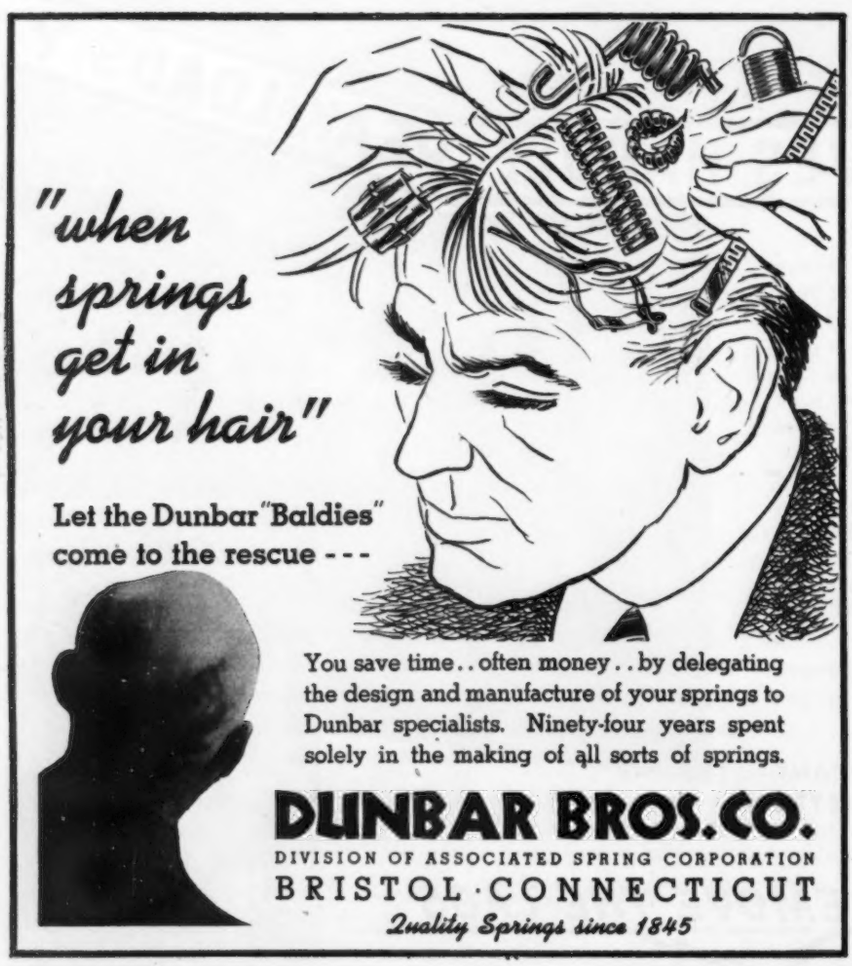
PITTSBURGH — Installation of modern laboratories which include student tables for micro-examination of specimens, photo-micrographic equipment, high speed cutting off wheels, hardness testing machines, bakelite mounting press, and wet wheels, has been announced by Dr. G. R. Fitterer, head of the department of metallurgical engineering, University of Pittsburgh. Other laboratory equipment includes high frequency induction and gas-fired melting furnaces, large forging hammer, arc and acetylene welding equipment, chemical assay laboratories, and machine shop.

24th Purchasing Agents Convention May 22-25

CHICAGO—The 24th annual international convention of the National Association of Purchasing Agents will be held May 22 to 25, at the Fairmont Hotel, San Francisco. Carrying as its theme, "Present Day Buying Problems in a World of Uncertainties," the meeting includes on its program Thurman W. Arnold, Assistant Attorney General; Almon E. Roth, president, San Francisco Employers' Council; Robert W. Strauss, research engineer, General Motors Corp.; and J. Hugh Jackson, dean, graduate school of business, Stanford University.

Chicago's First Steel Skyscraper to be Razed

ONE of Chicago's most historical landmarks, the 22-story Capitol Building, formerly the Masonic Temple, is to be wrecked to make room for a modernistic two-story building, the first to be tied up with Chicago's new subway. During the years 1892 to 1910, the Capitol Building was the tallest and best known office building in the world. It was said to be the first structure of its kind to be built with a skeleton framework consisting entirely of steel.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Let the Dunbar "Baldies" come to the rescue ---
You save time.. often money.. by delegating the design and manufacture of your springs to Dunbar specialists. Ninety-four years spent solely in the making of all sorts of springs.
DUNBAR BROS. CO.
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL · CONNECTICUT
Quality Springs since 1845

March Payrolls at Peak for 16 Months

STEEL payrolls in March reached the highest total in 16 months at $64,174,000, according to the American Iron and Steel Institute. Men employed averaged more than 455,000, against 453,000 in February and almost 455,000 in March 1938, while payrolls were more than 12 per cent above $57,044,000 in February, and were nearly 25 per cent greater than in March of last year.

Hourly earnings averaged 82.8c. per hr., as against 82.7c. in February and 81.8c. in March 1938, and hours worked a week were 34.7, which compares with 33.5 per week in February and 26.7 in March 1938.

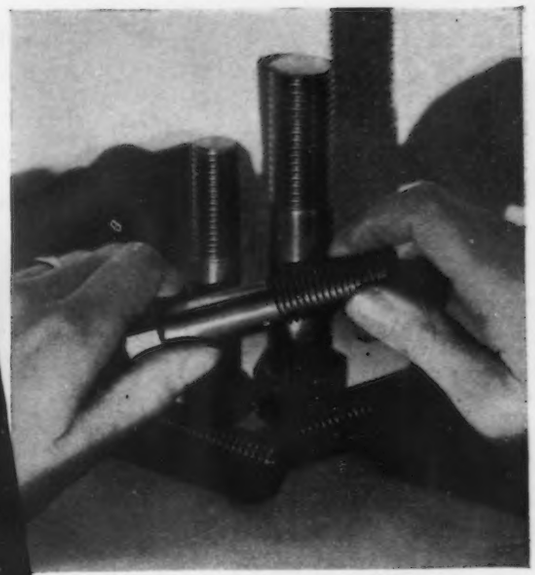
Marketers Told of Data In Commerce Department

THE wealth of statistical information available to industry through the United States Department of Commerce was discussed at a May 4 meeting of the Industrial Marketers of Detroit, chapter of the National Industrial Advertisers Association by R. G. Whaley of the Bureau of Foreign and Domestic Commerce. The new "Industrial Market Data Handbook" is to be published about July 1. Mr. Whaley referred, in particular, to the pioneering work which the department had done in distribution cost accounting, which provides information on how much it costs to sell certain products to customers in certain territories. The purpose of the meeting was to outline the types of information available for study of markets, selling costs, and similar information to serve as a basis for industrial advertising.

Concrete Steel Institute Elects New Directors

CHICAGO—At the 15th annual meeting of the Concrete Reinforcing Steel Institute, held at Augusta, Ga., April 20 to 21, the following directors were elected for the new year: Blair M. Boisseau, president, Virginia Steel Co., Richmond; H. E. Calves, vice-president, Taylor-Davis, Inc., Philadelphia; H. G. Daley, president, Sweet's Steel Co., Williamsport, Pa.; Ralph T. Rowles, assistant general manager of sales, Jones & Laughlin Steel Corp., Pittsburgh; F. H. Sparks, sales manager, Knoxville Iron Co., Knoxville, Tenn.; W. H. Stewart, manager of sales, reinforcing division, Truscon Steel Co., Youngstown.

BY THE BOX OR BY THE MILLION!



Kaufman PROCESS » » IS A METHOD OF MAKING BETTER cap screws

• Of course you can get cap screws which may meet your requirements that are not made by the Kaufman Process. But why not get greater strength and accuracy of fit when it costs you no more? Thread strength and accuracy is far greater in a cap screw made by the Kaufman Process, *patented*, our own plant development—than by any other method. Finish is improved—wrench fit is uniform—and a Class 3 fit insured. New standards of cap screw quality were set up when the Kaufman Process was developed. Ask for samples. THE CLEVELAND CAP SCREW COMPANY, 2929 East 79th Street, Cleveland, Ohio.

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Careystone CORRUGATED ROOFING AND SIDING

Protects Mammoth Cement Mill Against Weather, Fumes, Temperature

The main cement mill of The Great Lakes Portland Cement Corporation, Buffalo, was roofed and sided with Careystone 11 years ago. This time-defying material, composed of asbestos and Portland cement, is fireproof; cannot rust, rot or corrode; is impervious to weather, chemical fumes and salt air. Never requires painting or other upkeep.

Careystone Corrugated is made in standard sheets 42 inches wide; up to 10 feet long. Quickly, inexpensively applied. For reducing overhead plant costs, investigate Careystone Corrugated. Booklet on request.

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Waterproofing Materials . . . Expansion Joint . . . Asbestos Paper and Millboard

THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
BRANCHES IN PRINCIPAL CITIES

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New
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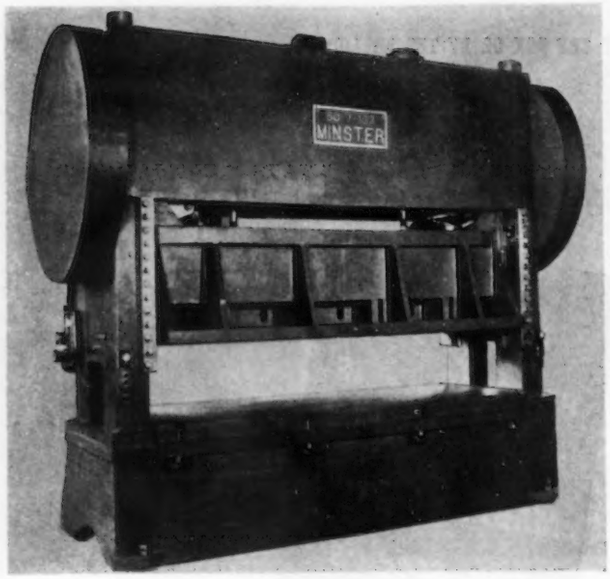
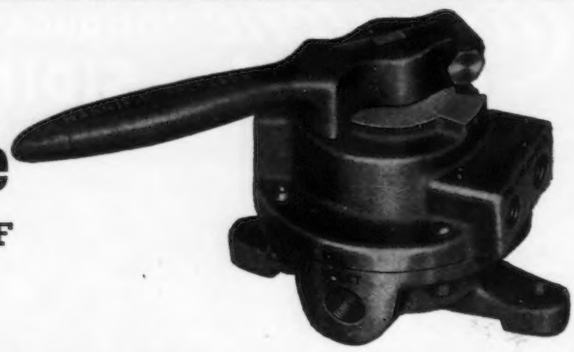


represents a scientific distribution of weight, using low stress figures and following through with a pleasing appearance. The long bearing guides on the slide insure a uniform pressure over the entire surface of the bed.

There is a Minster for your work

THE MINSTER MACHINE CO., Minster, Ohio

Stop Leakage
AND WASTE OF
AIR POWER



Hannifin "Pack-less" Air Control Valves have simple disc-type design, with the bronze disc ground and lapped to form a perfect seal with the seat. There is no packing, and no leakage or packing maintenance troubles. Smooth acting, positive control means better performance of air operated equipment.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, heavy duty rotary, electric, and special models. Write for Valve Bulletin 34-A.

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ENGINEERS • DESIGNERS • MANUFACTURERS • *Pneumatic and Hydraulic Production Tool Equipment*

HANNIFIN *"Packless"* AIR CONTROL VALVES

This Week On The Assembly Line

(CONTINUED FROM PAGE 64)

weight, 1700 lb., is supposed to include the implement as well as the tractor. Thus, for a total weight considerably under 2000 lb., the farmer will have a unit comparable to the usual tractor weighing 3000 lb. or more which must tow a 1200 to 1500 lb. implement behind it. The tractor, as predicted previously, will use a four-cylinder engine.

Ford's announcement that the tractor would be built in "B" building leads to questions about where present "B" building operations will be transferred. Part of this was done long ago when the tool and die work was transferred to the new die shop. At the same time, many of the operations in parts manufacture, including replacement parts, were transferred to the new pressed steel building.

Packard's announcement last week of a $100 to $300 reduction in prices in the Packard Six, 120 and Eight groups (THE IRON AGE, May 4, page 92) has an interesting background. It will be recalled that M. M. Gilman, the new president, stressed the fact that the new prices were made possible by production economies which Packard has effected, and culminates a four-year expansion program.

The program dates back to Packard's initial tooling up for mass production of six-cylinder cars in what was virtually the custom-built field. At that time Packard had to change its entire philosophy of manufacturing because all of its old employees and executives thought strictly in terms of the low-volume, expensive limousine. The entire industry watched with admiration at the deep-seated changes which took place. Packard thinking and Packard acting were geared to an entirely new pace as the company launched its mass production car. Wisely, Packard called in many executives who had devoted years to mass production activities in other plants. As a result, Packard has attained a position where, as mentioned before in the Assembly Line, it now has the greatest output per square foot of floor space of any plant in the industry.

The changes have been climaxed by the construction of a bridge over East Grand Boulevard, which heretofore has separated the Packard plant into two major units, preventing close coordination of manufacturing processes. The bridge, over which the body line and a continuous flow of materials in process will travel, actually has been the key to completing the program. But behind that, has been an extensive revamping of mate-

rials handling equipment in the plant, rearrangement of some shop facilities, and new production schedules.

As a result, Packard is now much nearer the lowest price field, offering the six cylinder car at $888 delivered in Detroit (less state taxes). This also means that if Packard goes through with plans for a lighter six cylinder car, it must very definitely invade the field dominated by the Big Three.

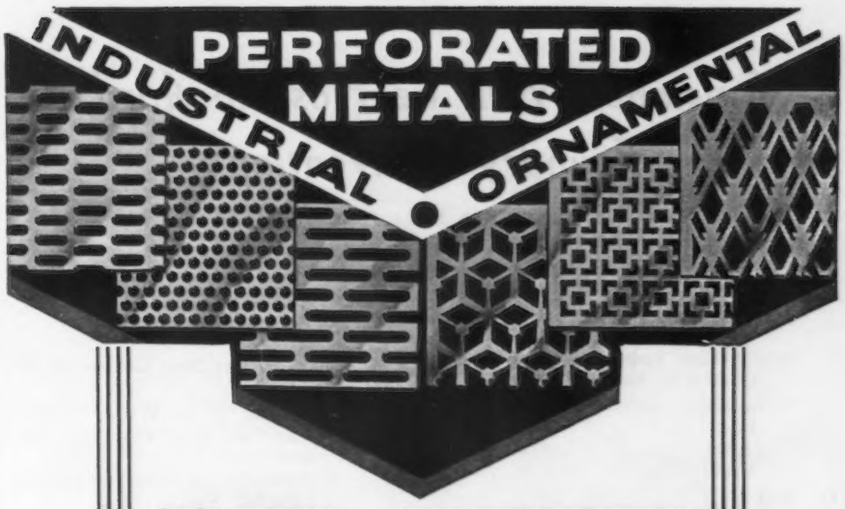
In place of the copper plating formerly used to treat the sides of the lower end of connecting rods, Graham-Paige is using Thermoil Granodine solution to treat the rods. This treatment gives a surface layer of iron and manganese phosphates integrated with the metal beneath. This coating when subjected to friction burnishes quickly and prevents scuffing and undue wear during the initial break-in period.

Crosley has ordered 5000 engines for the new two-cylinder automobile. This is the initial order and, according to parts suppliers, will be increased to a total of 25,000 engines shortly if the car is well enough received by dealers. Initial estimates were on the basis of 25,000 units and Crosley has 25,000 dealers.

Special courses in diesel engine work and in new hydraulic type transmissions will be added to the course of the seventh annual training school for teachers of automotive mechanics in high schools and colleges, at General Motors Institute at Flint, Mich., according to Major Albert Sobey, director of the Institute.

The course is open to qualified teachers and those in allied professions who are designated by school authorities or representatives of General Motors are being eligible for such training. There will be two sessions, one opening June 26 and closing July 21. The second begins July 24 and closes Aug. 18. Nearly three hundred teachers from 44 states and six provinces of Canada have come to the institute since the summer training courses began in 1933. China also has been represented.

The course of instruction covers automotive specifications and adjustments, vocational guidance information, service methods and procedure and actual shop training. The entire line of new General Motors diesels has been set up in the institute's laboratory for use in the instruction. The engines are the new two-cycle, 71 series, which are made in three, four and six-cylinder sizes. The hydraulic transmission which will be used in connection with the two-cycle diesel engine is the one for installation in trucks and coaches.



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Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

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ALLOY HY-TEN STEELS

ALLOY S. A. E. STEELS

Immediate Shipment from Six Warehouses

Reduce your tool and die costs with HY-TEN "M" TEMPER, .70 CARBON CR-NI-MOLY oil hardening alloy steel. Extreme toughness at high degrees of hardness. Rounds, squares and flats in stock. Forgings of all types.

Send for descriptive folder

WHEELOCK, LOVEJOY & CO., INC.

CAMBRIDGE CLEVELAND CHICAGO NEWARK DETROIT BUFFALO

Cincinnati Will be Host to 43rd Foundry Convention

(CONTINUED FROM PAGE 61)

Hot Strength and Collapsibility of Foundry Sands, by H. W. Dietert and E. E. Woodliff, Harry W. Dietert Co., Detroit.

11:00 Annual Business Meeting and Board of Awards Lecture

Chairman, President Marshall Post.

Speaker, Fred H. Clausen, Van Brunt Mfg. Co., Horicon, Wis.

P.M. 2:00 Steel

Chairman, John Howe Hall, Philadelphia.

Co-Chairman, D. C. Zuege, Sivyer Steel Casting Co., Milwaukee.

A Rapid Method for Determining Carbon in Plain Carbon Steels for Control Purposes, by H. H. Blosjo, Minneapolis Electric Steel Foundry, Minneapolis.

A Discussion on Steel Castings Having High Mechanical Properties, by George Delbart, Societe Francaise de Constructions Mecaniques, Paris, France. (Official Exchange Paper of Association Technique de Fonderie De France).

Report of Committee on Heat Treatment.

Synthetic Bonded Steel Molding Sands, by C. W. Briggs, Steel Founders' Society, Cleveland, and R. E. Morey, Naval Research Laboratory, Anacostia, D. C.

Report of Committee on Coupon Tests.

2:00 Sand Research

Chairman, H. S. Washburn, Plainville Casting Co., Plainville, Conn.

Co-Chairman, W. G. Reichert, Singer Mfg. Co., Elizabeth, N. J.

Elements of Petrographic Study of Molding Sands, by R. E. Grim, Illinois Geological Survey, Urbana, Ill.

Mineral Composition and Textures of the Clay Grade of Molding Sand, by C. E. Schubert, University of Illinois, and R. E. Grim, Illinois Geological Survey, Urbana, Ill.

Report of Sand Research Committee.

2:00 Foundry Costs

Chairman, R. L. Lee, Liberty Foundry Co., Wauwatosa, Wis.

Molding Costs—Committee Report.

Melting Costs—Committee Report.

4:00 Lecture Course—Third Session

Chairman, Horace Deane, Deere & Co., Moline, Ill.

The Microscope in Elementary Cast Iron Metallurgy, by R. M. Allen, Bloomfield, N. J.

7:00 Annual A.F.A. Dinner

Presentation of Medal Awards.

THURSDAY—MAY 18

A.M. 9:00 Gray Iron Shop Course—Fourth Session

Chairman, J. A. Woody, American Cast Iron Pipe Co., Birmingham, Ala.

Cupola Operation, by John Lowe, Lansing, Mich.

9:30 Symposium on Steel Melting Practices

Chairman, T. N. Armstrong, International Nickel Co., New York.

Co-Chairman, John Howe Hall, Philadelphia.

Acid Electric, by W. G. Finster, Reading Steel Castings Division, American Chain & Cable Co., Reading, Pa.

Basic Electric, by C. W. Briggs, Steel Founders' Society, Cleveland.

Basic Open Hearth, by J. W. Porter, American Steel Foundries, East Chicago, Ind.

Acid Open Hearth, by W. C. Harris, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

Converter, by F. B. Skeates, Link-Belt Co., Chicago.

Induction Furnace, by G. F. Landgraf, Lebanon Steel Foundry, Lebanon, Pa.

10:00 Gray Iron

Chairman, A. L. Boegehold, General Motors Corp., Detroit.

Co-Chairman, L. H. Rudesill, Griffin Wheel Co., Chicago.

Influence of Composition on the Physical Properties of Gray Iron, by R. G. McElwee, Vanadium Corp. of America, Detroit, and R. Schneidewind, University of Michigan, Ann Arbor, Mich.

Some Factors in Hardening and Tempering Gray Cast Iron, by V. A. Crosby, G. A. Timmons, A. J. Herzig, Climax Molybdenum Co., Detroit.

Effects of Heat Treatment on Combined Carbon and Physical Properties of Cast Iron, by S. C. Massari, Association of Manufacturers of Chilled Car Wheels, Chicago.

10:00 Pattern Making

Chairman, Vaughan Reid, City Pattern Works, Detroit.

Co-Chairman, H. M. Harrold, Caterpillar Tractor Co., Peoria, Ill.

Some Pattern Making Problems, by J. A. Kolb, Caterpillar Tractor Co., Peoria, Ill.

P.M. 12:30 Gray Iron Division Luncheon

12:30 Steel Division Luncheon

Chairman, A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn.

Co-Chairman, T. N. Armstrong, International Nickel Co., New York.

Deoxidizers—Discussion Leaders: C. E. Sims, Battelle Memorial Institute, Columbus, and A. P. Gagnebin, International Nickel Co., Bayonne, N. J.

Reduction of Silicon from Slag—Discussion Leaders: D. C. Zuege, Sivyer Steel Casting Co., Milwaukee, and H. H. Blosjo, Minneapolis Electric Steel Casting Co., Minneapolis.

2:00 Plant Visitation

Hamilton Coke & Iron Division, American Rolling Mill Co., Hamilton, Ohio. Buffet Supper at the Hamilton Country Club.

1000 Attend Welding Clinic at Pittsburgh

PITTSBURGH—More than 1000 engineers, foremen, and industrial executives interested in welding and welding technique, attended a clinic on these subjects at the Williams & Co., Inc., warehouses here last week. Coincident with this presentation of welding applications was the opening of a new auxiliary warehouse by Williams & Co.

Demonstrations by companies for which Williams & Co., Inc., is sole distributor were held by International Nickel Co., Westinghouse Electric & Mfg. Co. (welding machines), Wilson Welder & Metals Co., American Manganese Steel Division of the American Brake Shoe & Foundry Co., Arcos Corp., Speer Carbon Co., and Hanover Co., Aluminum Co. of America and Johnson Bronze Co., for whom Williams & Co., Inc., is sole warehouse distributer, also presented practical applications of welding technique.

Ryerson Honors A. C. Allshul

ARTHUR C. ALLSHUL, plant manager at Philadelphia for Joseph T. Ryerson & Son, Inc., and senior employee of that company with 40 years' service, will be honored at a dinner planned by fellow employees. Mr. Allshul joined the Ryerson company, in Chicago in 1899, was plant manager at Buffalo from 1919 to 1929 and has since been at Philadelphia.

Hopkins Backs New Deal's Spending, Censures C. of C.

WASHINGTON — Still looking weak and fatigued but clearly recuperating, Secretary of Commerce Harry L. Hopkins returned to his desk Monday morning after a long siege of illness, granted his fourth press interview since he was elevated to a cabinet post, and declined flatly to either repudiate or affirm his Des Moines, Iowa, business-placating speech. Going further, he refused to comment in any way on the Administration's attitude toward business, despite sharp prodding to get his views on tax relief and other subjects to indicate what may be in the New Deal's mind in the way of aiding business.

He did, however, fall back on statistics to support his contention that the Chamber of Commerce of the United States last week in speeches and resolutions manifested a pessimism that is not warranted. Moreover, making pointed thrusts at the chamber, he said it did not represent the mass of business opinion. Much of his discussion was devoted to the criticism of the chamber. For this reason the impression was gained that the chamber's anti-New Deal barrage of criticism has considerably irked the Administration.

Cruised with President

Color was given to Hopkins' noncommittal position regarding the Administration's business policy because Mr. Hopkins, together with Supreme Court Justice William O. Douglas, was an all-day guest of President Roosevelt on a Potomac river cruise on Sunday. Rightly or not, the opinion prevailed that Mr. Hopkins had either been silenced respecting a business-aid policy or had actually reversed the favorable stand he had taken in his Des Moines speech.

Mr. Hopkins pleaded that he did not want to comment on any business program because he had just returned to his duties and was not familiar with current conditions. The plea apparently was not acceptable inasmuch as his absence hardly could have justified failure to either affirm or reverse the business policy he had previously announced when he took up his work as head of the Department of Commerce. Mr. Hopkins did state that the Administration has no new plans for business stimulation, a statement that was taken to mean the New Deal will make no further gestures at this time to spur recovery.

Rather it appears to be taking the position that recovery, while not satisfactory, actually is under way and that the Administration is and always has been favorably disposed toward business.

"Appeasement," Mr. Hopkins said, thereby unquestionably denoting the general New Deal attitude, "was created by our opponents—quite deliberately created, I think."

This comment was a side-swipe at the Chamber of Commerce, whose pessimistic tone was assailed by Mr. Hopkins. He said he could not understand why in a nation with such great resources, there should be a defeatist attitude toward the private economic system, which, he held, was reflected by the chamber. He declared he did not think the chamber showed an objective view toward economic problems.

"We should not get emotional about them," said the Secretary.

As if feeling that he was showing too much sensitiveness to the chamber's New Deal criticism, Mr. Hopkins paused to say he thought the correspondents were overemphasizing the importance of the chamber.

"I think it is extremely important that the Administration's fiscal policy be carried out during the coming year and that private industry do all it can," said Mr. Hopkins. By "fiscal policy" the commerce Secretary meant the Administration's spending program.

The Secretary, whose face again is showing a healthful glow, said with some force, yet quietly, that business is better on a good many fronts. Building by private industry (much of it Government-insured) was said to be better than at any time since 1929. Industrial production was said to be 24 per cent higher than it was in the first quarter of 1938. The dollar volume of retail sales, Mr. Hopkins stated, is 5 per cent higher than it was in the first quarter of 1938. The whole national income for the first quarter of the current year was said to have been at the rate of $66,000,000,000 against a total of $62,000,000,000 in 1938.

April Steel Output 12% Below March

PRODUCTION of 2,986,985 gross tons of open hearth and Bessemer steel ingots during April, as reported by the American Iron and Steel Institute, represented a decline of 12 per cent from March when 3,396,021 gross tons was produced.

The April figure was about 55 per cent greater than the output in April 1938, when the total was 1,919,042 gross tons.

An average of 696,267 gross tons of ingots was produced per cent of capacity, the lowest monthly operating rate since September of last year. The industry operated at 56.14 per cent of capacity in March, and at 33.34 per cent in April a year ago.

An average of 696,267 gross tons of ingots was produced per week during April, as against 766,596 gross tons per week in March and 447,329 gross tons per week in April, 1938.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
1938	Open-Hearth	Bessemer	Monthly	Weekly		
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months	9,889,435	763,843	10,788,583	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.29
August	2,309,207	196,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	25,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,216,653	726,107	4.43	53.18
February	2,710,696	196,186	2,982,011	745,503	4.00	54.60
March	3,115,022	194,694	3,396,021	766,596	4.43	56.14
1st Quarter	8,812,173	538,374	9,594,685	746,087	12.86	54.64
April	2,706,199	265,771	2,896,985	696,267	4.29	50.99

Figures for both 1938 and 1939 have been revised.

REINFORCING STEEL

. . . Awards of 10,350 tons: 13,600 tons in new projects.

ATLANTIC STATES

AWARDS

3000 Tons, New York, East River drive, to Carnegie-Illinois Steel Corp., Pittsburgh, through J. Rich Steers, Inc., New York.
406 Tons, Bedford and Fulton Counties, Pa., Sections 13 and 14, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa., through Empire Construction Co.
300 Tons, Washington, Thomas Jefferson Memorial, to Bethlehem Steel Co., Bethlehem, Pa.
300 Tons, Buffalo, W. T. Grant store, to Bethlehem Steel Co., Buffalo.
223 Tons, Westmoreland County, Pa., Section 4A, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa.
150 Tons, Buffalo, Sears, Roebuck & Co. addition, to the Bethlehem Steel Co., Buffalo.
100 Tons, Yonkers, N. Y., highway, Fleetwood section, contract 418, to Bethlehem Steel Co., Bethlehem, Pa.

CENTRAL AND WESTERN STATES

2741 Tons, Chicago, second section, subway, to Ceco Steel Products Co., Chicago, through M. J. Boyle & Co., Chicago.
2100 Tons, New Orleans, housing project, to Connor Steel Co., Birmingham.
457 Tons, Pasadena, Cal., Arroyo Seco bridge, to Ceco Steel Products Co., Los Angeles, through Contracting Engineers, Los Angeles.
160 Tons, Hardin-Meade County, Ky., State highway project, FA 79-D, District No. 4, to Laclede Steel Co., St. Louis.
144 Tons, Palo Alto, Cal., hospital, to Bethlehem Steel Co., San Francisco, through K. E. Parker Co., San Francisco.
140 Tons, Bloomington, Ind., music hall, to Calumet Steel Co., Chicago.
110 Tons, LaCrosse, Wis., school, to Bethlehem Steel Co.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1700 Tons, New York, section of East River drive; bids due May 19.
1300 Tons, Philadelphia, Glenwood Avenue housing development; Wark Co., low bidder.
800 Tons, Elizabeth, N. J., housing project.
700 Tons, Washington, administration group buildings, Municipal Center.
600 Tons, Westmoreland County, Pa., Pennsylvania Turnpike Commission, Section 3B; bids May 12.
390 Tons, Buffalo, municipal auditorium, F. W. Hendrich Co., Inc., low bidder.
270 Tons, Middletown, N. Y., high school.
218 Tons, North Bergen, N. J., housing project.
200 Tons, Washington, Lansburg Bros. warehouse; James L. Parsons, low bidder.
150 Tons, Erie County, N. Y., highway No. 216-5-39; bids close May 16.
112 Tons, New York, freight terminal for New York Central Railroad, James Stewart & Co., New York, general contractor (previously reported).
100 Tons, Windsor-Cummington-Worthington, Mass., State road and bridges.

CENTRAL AND WESTERN STATES

3350 Tons, Chicago, seventh subway section; Paschen Brothers Construction Co., Chicago, low bidder.
1000 Tons, Louisville, Ky., housing project; Struck Construction Co., Louisville, low bidder on general contract.
750 Tons, Seattle, Ballard bridge approach; Acme Construction Co., West Coast Construction Co., and Macri Brothers, Seattle, joint low bidders (Alternate B.).
500 Tons, Cleveland, Luna Park housing project; bids June 2.
250 Tons, Chicago, viaduct, 33rd and Western Avenue.
200 Tons, Kokomo, Ind., housing project.
189 Tons, Urbana, Ill., Natural Resources building, University of Illinois; bids in.
160 Tons, Mazon, Ill., bridge.
158 Tons, San Francisco, underpass between Lake Street and Golden Gate bridge approach; bids May 24.
150 Tons, San Francisco, Bayer warehouse; Cahill Brothers, contractors.
150 Tons, St. Louis, Clinton-Peabody School; Fleischer-Seeger Construction Co., St. Louis, low bidder on general contract.
110 Tons, Honolulu, T. H., Wailuku School.
100 Tons, San Francisco, Best Foods warehouse.
100 Tons, San Francisco, American Smelting & Refining Co. plant.

CAST IRON PIPE

Melrose, Mass., has contracted with Warren Foundry & Pipe Corp. for its 1939 class 150, 6 to 12-in. pipe requirements.

Providence, R. I., has awarded 396 tons of 6, 8, 12 and 30-in. pipe to Warren Foundry & Pipe Corp.

Gaffney, S. C., plans water pipe line extensions and improvements, totaling about 16,635 ft. of 6-in. and smaller. Fund of about $31,000 has been arranged through Federal aid for this and sewerage system expansion.

Fredonia, Kan., plans pipe line extensions and replacements in water system. Fund of about $61,000 is being arranged for this and other waterworks installation, of which about $38,000 will be a Federal grant. Paulette & Wilson, Farmers' Union Building, Salina, Kan., and 1006 Kansas Avenue, Topeka, Kan., are consulting engineers.

Butler County Board of Commissioners, County Courthouse, Hamilton, Ohio, plans pipe lines for water system in Dixie Heights area, including 10, 6 and 3-in., spiral welded pipe, pipe specials, etc.; also for similar water system in Rosedale district, requiring 6-in. and spiral welded pipe. Harry J. Duane, first noted address, is county sanitary engineer.

Henrico County Board of Commissioners, Richmond, Va., Willard F. Day, county manager, plans pipe lines for water system in Sanitary District No. 1. Roswell D. Trimble, American Building, is consulting engineer.

Medora, Jackson County, Ind., plans pipe lines for water system and other waterworks installation, including 50,000-gal. elevated steel tank and tower, deep-well pumping machinery and accessories. Cost about $60,000. Special election is being arranged to vote bonds for work.

United States Engineer Office, Gay Building, Little Rock, Ark., will close bids about June 29 for construction of spillway and completion of embankment of Great Salt Plains dam, near Cherokee, Okla., requiring about 32,000 lb. of cast iron pipe; also approximately 34,000 lb. of wrought iron pipe.

City Water Co., Chattanooga, Tenn., plans pipe line extensions in water system in Alton Park, St. Elmo, Fort Oglethorpe and Eossville districts, including main trunk lines. Cost about $60,000.

San Bernardino, Cal., has awarded 4000 ft. of 4-in. and 10,000 ft. of 6-in. to National Cast Iron Pipe Co., Los Angeles, and 5000 ft. of 8-in. to Utilities Supply Co., Los Angeles.

. . . PIPE LINES . . .

American-Michigan Pipe Line Co., Mount Pleasant, Mich., affiliated with Michigan Consolidated Gas Co., 415 Clifford Street, Detroit, is considering new welded steel pipe line from natural gas field in Lincoln, Freeman and Redding Townships, Clare County, Mich., to gas area in Austin Township, Mecosta County, Mich., about 30 miles, for natural gas transmission, supplementing supply from last noted field for transmission to Muskegon, now being furnished from Austin territory. Steel pipe line gathering system will be installed in first mentioned area. Cost close to $225,000.

Panhandle Refining Co., Wichita Falls, Tex., plans new 4-in. welded steel pipe line from local refinery to connection with bulk station and pipe line system, about 26 miles distant, for oil transmission. Cost over $100,000.

Lion Oil Refining Co., Eldorado, Ark., has authorized immediate installation of new 6-in. welded steel pipe line from Kerlynn oil field, near Magnolia, Ark., to connection with main pipe line system in Shuler oil fields, Columbia County, about 14 miles, for crude oil transmission. From latter point company has pipe line leading to refinery at Eldorado. Cost close to $100,000 with booster stations and other operating facilities.

Bureau of Reclamation, Denver, asks bids until May 25 for steel pipe, fittings, valves and accessory equipment for by-pass and air piping for Grand Coulee pumping station, Grand Coulee, Columbia Basin, Wash. (Specifications 1228-D).

Northern Pipe Line Co., Mount Pleasant, Mich., has let general contract to H. L. Gentry Engineering Co., Jackson, Mich., for new electric-welded 6-in. steel pipe line from gas field at Arenac, Mich., to Midland, Mich., about 55 miles, for natural gas transmission. Connection will be made with company system at latter point. Cost close to $200,000.

Tucson, Ariz., has engaged A. A. Weiland, Pueblo, Colo., consulting engineer, to make surveys and plans for pipe line system for natural gas distribution, including main welded steel pipe line for connection with new trunk line of El Paso Natural Gas Co., El Paso, Tex., which will furnish supply. A control station will be built. Cost about $135,000. Financing in that amount has been arranged.

Houma, La., has called special election on May 23 to approve bond issue of $250,000 for steel pipe line system for natural gas distribution, including main welded steel pipe line for connection with source of supply, control station and other operating facilities. Pipe requirements will approximate 170,000 lin. ft. T. Baker Smith is city engineer.

Grand River Oil Co., Grand Rapids, Mich., recently organized to take over Imperial Refining Co., Grand Rapids, plans welded steel pipe line, about 10,600 lin. ft., from new oil field in Wyoming Township, near Grand Rapids, to new refinery in same district, where site has been secured, for crude oil supply for plant. A pipe line gathering system will be installed. Entire project will cost about $125,000. Albert H. Hickey, Alma, Mich., is vice-president and general manager.

CHARLES W. HEPPENSTALL (center), chairman of the Heppenstall Co., Pittsburgh, was honored recently at Bridgeport, Conn., in a celebration marking the company's 50th anniversary. At the left is Samuel B. Heppenstall and at the right, Robert B. Heppenstall, also officials of the company. Service buttons were awarded veteran employees.

April Pig Iron Rate At 50.4% of Capacity

REVISED production of coke pig iron in April totaled 2,056,177 gross tons, compared with 2,394,615 tons in March. On a daily basis output dropped 11.3 per cent from that in March, or from 77,246 tons in March to 68,539 tons in April. The rate of operation was at 50.4 per cent of the industry's capacity as compared with 56.8 per cent in March.

There were 102 furnaces in blast on May 1, operating at the rate of 60,160 tons a day, compared with 123 on April 1, producing at the rate of 77,460 tons daily.

The names of furnaces blown out or banked or placed in operation appeared in our preliminary estimate of blast furnace operations for April in last week's issue, page 93.

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1939	1938	1939	1938
January	2,175,423	1,429,085	20,805	22,388
February	2,060,187	1,298,268	18,655	20,205
March	2,394,615	1,452,487	16,008	21,194
April	2,056,177	1,376,141	11,518	18,607
May	.....	1,255,024	....	13,341
June	.....	1,062,021	....	14,546
½ year	.....	7,873,026	....	110,281
July	.....	1,201,785	....	20,318
August	.....	1,493,995	....	6,088
September	.....	1,680,435	....	630
October	.....	2,052,284	....	3,621
November	.....	2,269,983	....	13,156
December	.....	2,210,728	....	19,197
Year	.....	18,782,236	....	173,791

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1939	1938	1937	1936	1935
January	10,603	10,635	16,106	10,537	3,926
February	9,637	8,854	16,514	11,296	6,288
March	8,951	8,524	16,457	10,831	7,089
April	8,508	8,273	14,517	13,897	8,799
May	.....	6,431	19,483	12,814	8,441
June	.....	5,375	15,870	14,209	7,874
July	.....	5,495	19,609	11,619	8,644
August	.....	6,614	17,831	12,148	8,194
September	.....	11,205	20,065	12,526	10,090
October	.....	10,799	18,950	13,645	11,199
November	.....	13,208	15,662	14,739	12,503
December	.....	9,130	10,964	14,852	13,312

Daily Average Production of Coke Pig Iron

Gross Tons

	1939	1938	1937	1936	1935
January	70,175	46,100	103,597	65,351	47,656
February	73,578	46,367	107,115	62,886	57,448
March	77,246	46,854	111,596	65,816	57,098
April	68,539	45,871	113,055	80,125	55,449
May	.....	40,485	114,104	85,432	55,713
June	.....	35,400	103,584	86,208	51,570
½ year	.....	43,497	108,876	74,331	54,138
July	.....	38,767	112,866	83,686	49,041
August	.....	48,193	116,317	87,475	56,816
September	.....	56,015	113,679	91,010	59,216
October	.....	66,203	93,311	96,512	63,820
November	.....	75,666	66,891	98,246	68,364
December	.....	71,314	48,075	100,485	67,950
Year	.....	51,458	100,305	83,658	67,556

Production by Districts and Coke Furnaces in Blast

FURNACES	Production (Gross Tons) April, 30 Days	Production (Gross Tons) March, 31 Days	May 1 Number in Blast	May 1 Operating Rate, Tons a Day	April 1 Number in Blast	April 1 Operating Rate, Tons a Day
New York:						
Buffalo	137,374	140,266	7	4,205	8	4,525
Other New York and Mass.	.....	5,186	0	....	0	....
Pennsylvania:						
Lehigh Valley	54,512	60,640	4	1,815	4	1,955
Spiegeleisen	4,415	4,473	1	145	1	145
Schuylkill Valley	15,286	17,557	2	595	1	565
Susquehanna and Lebanon Valleys	16,746	17,121	1	560	1	550
Pittsburgh district	396,247	*467,528	18	10,825	22	*15,360
Ferro. and Spiegel	5,271	6,146	1	175	1	200
Shenango Valley	13,001	24,016	0	....	1	725
Western Pennsylvania	43,272	54,677	2	1,250	3	1,765
Ferro. and Spiegel	3,231	6,675	1	110	1	215
Maryland	121,332	125,950	4	4,045	4	4,065
Wheeling District	95,354	124,011	4	2,810	5	3,480
Ohio:						
Mahoning Valley	187,805	*224,670	7	5,080	11	*7,820
Central and Northern	173,539	223,162	10	5,525	12	7,410
Southern	47,744	52,630	5	1,590	5	1,700
Illinois and Indiana	411,772	458,592	15	12,030	19	14,795
Michigan and Minnesota	79,877	88,637	4	2,185	5	2,860
Colorado, Missouri and Utah	42,238	43,322	3	1,410	3	1,395
The South:						
Virginia	.....	.....	0	....	0	....
Ferromanganese	3,016	3,187	1	100	1	105
Kentucky	13,224	13,913	1	440	1	450
Alabama	190,921	232,256	11	5,265	14	7,975
Tennessee	.....	.....	0	....	0	....
Total	2,056,177	*2,394,615	102	60,160	123	*77,460

*Revised.

April Construction 25 Per Cent Higher

CONTRACTS for heavy engineering projects awarded in April amounted to $240,735,000, an average of $60,184,000 a week, according to *Engineering News-Record*. This represents a 25 per cent increase over the weekly average of April, 1938, and a 5 per cent gain over March, 1939. For the first four months of the current year awards total $1,041,837,000, or 23 per cent above the volume of the comparable period of 1938. Of the present year's total, public work accounts for $775,678,000, a gain of 66 per cent over a year ago, while private work amounts to $266,159,000, 30 per cent below the like period of 1938.

British Steel Output in April 1,058,200 Tons

LONDON, May 9 (*By Cable*)—Steel ingot production in the United Kingdom in April was 1,058,200 tons. Pig iron output totaled 608,900 tons.

Iron and Steel Imports (In Gross Tons)

	March		Three Months Ended March	
	1939	1938	1939	1938
Pig iron	3,658	746	4,847	13,847
Sponge iron	151	151	451	312
Ferromanganese[1]	3,307	1,058	9,346	2,339
Spiegeleisen	2,176	200	5,185	631
Ferrochrome[2]	34	.....	34	20
Ferrosilicon[3]	125	53	472	157
Other ferroalloys[4]	38	.....	70	1
Scrap	780	227	5,526	449
Pig iron, ferroalloys and scrap	*10,269*	*2,435*	*25,931*	*17,756*
Steel ingots, blooms, etc.	2	.....	3	.....
Billets, whether solid or hollow	32	38	46	292
Wire rods	821	369	2,728	1,461
Semi-finished steel	*853*	*407*	*2,777*	*1,753*
Concrete reinforcement bars	183	23	710	331
Hollow steel bars	134	92	297	320
Merchant steel bars	1,586	1,140	5,159	4,397
Iron slabs	.....	.....	.....	.....
Iron bars	59	9	188	135
Boiler and other plate (including skelp)	2	18	2	55
Sheets, skelp, and saw plate	224	1,015	491	2,554
Die blocks or blanks, etc.	12	7	14	14
Tin plate, taggers' tin and terne plate	4	12	19	20
Structural shapes	3,865	2,123	9,811	7,342
Sashes and frames	.....	.....	5	.....
Sheet piling	.....	.....	.....	.....
Rails and track material	212	419	599	941
Welded pipe	814	265	1,301	1,169
Other pipe	1,328	1,083	9,015	9,221
Cotton ties	.....	.....	2	19
Other hoops and bands	1,867	724	5,431	4,164
Barbed wire	2,065	538	4,731	5,679
Round iron and steel wire	348	96	915	296
Telegraph and telephone wire	.....	3	1	5
Flat wire and steel strips	296	247	732	847
Wire rope and strand	126	228	500	606
Other wire	155	82	646	452
Nails, tacks, and staples	779	365	2,128	1,799
Bolts, nuts, and rivets	18	13	36	34
Horse and mule shoes	25	20	133	78
Rolled and finished steel	*14,102*	*8,522*	*42,866*	*40,478*
Cast iron pipe and fittings	71	238	203	492
Malleable iron screwed fittings	5	12	20	31
Castings and forgings	67	213	385	537
Total	25,369	11,827	72,182	61,047

[1] Manganese, [2] chrome, [3] silicon, and [4] alloy content, respectively.

Iron and Steel Exports (In Gross Tons)

	March		Three Months Ended March	
	1939	1938	1939	1938
Pig iron	1,059	22,519	11,908	112,848
Ferromanganese and spiegeleisen	18	52	27	109
Other ferroalloys	68	202	193	439
Scrap, iron and steel	310,223	334,742	758,361	946,150
Scrap, tin plate	1,303	2,132	4,293	3,856
Waste-waste tin plate	736	1,774	2,405	1,969
Pig iron, ferroalloys and scrap	*313,407*	*361,421*	*777,187*	*1,065,371*
Ingots, blooms, billets, sheet bars	5,709	22,992	29,215	89,526
Ingots, etc., alloy steel, incl. stainless	408	29	4,724	631
Skelp	714	1,623	2,093	2,754
Wire rods	2,654	5,377	3,367	8,648
Semi-finished steel	*9,485*	*30,021*	*39,399*	*101,559*
Bars, plain and reinforcing	15,381	15,202	35,022	43,539
Bars, alloy steel	993	284	3,489	1,211
Bars, stainless steel	117	9	132	155
Iron bars	58	136	173	548
Plates, plain and fabricated	28,428	18,632	60,485	58,928
Plates, alloy steel	70	317	178	791
Plates, stainless	8	1	17	23
Sheets, galvanized steel	7,202	8,095	19,961	16,955
Sheets, galvanized iron	385	236	1,149	825
Sheets, black, plain steel	27,805	20,315	71,959	56,373
Sheets, alloy steel	290	294	668	1,558
Sheets, stainless	76	329	169	513
Sheets, black iron	616	488	1,769	1,578
Hoops, bands, strips, plain steel	4,044	4,945	19,078	17,759
Hoops, bands, strip steel, alloy	25	43	71	78
Hoops, bands, strip steel, stainless	21	17	222	167
Tin plate and taggers tin	16,735	15,201	40,373	49,337
Terne plate (including long ternes)	232	417	611	1,729
Structural shapes, plain material	6,522	6,456	17,529	23,470
Structural material, fabricated	3,513	3,859	7,257	12,869
Sheet piling	140	331	853	1,208
Tanks, steel	2,881	2,691	4,697	10,163
Steel rails	4,274	8,865	12,203	29,080
Rail fastenings, switches, spikes, etc.	1,459	1,096	4,153	3,645
Boiler tubes	656	677	1,491	1,536
Casing and oil line pipe	5,855	11,304	15,448	26,923
Pipe, black and galv., welded steel	3,648	2,147	9,177	5,959
Pipe, black and galv., welded iron	584	282	1,808	1,334
Plain and galvanized wire	4,927	2,560	12,889	8,868
Barbed wire and woven wire products	3,935	1,786	8,942	3,985
Wire rope and other products	997	1,024	2,789	2,721
Nails and tacks	1,956	1,813	5,375	4,358
Bolts, nuts, rivets and washers except track	774	806	1,909	2,122
Other finished steel	557	230	1,436	1,454
Rolled and finished steel	*145,164*	*130,888*	*363,482*	*391,762*
Cast iron pipe and fittings	1,995	2,078	6,747	5,654
Malleable iron screwed fittings	270	291	827	715
Carwheels and axles	2,424	915	5,136	4,791
Castings, iron and steel	484	464	1,440	1,536
Castings, alloy steel, incl. stainless	116	74	394	151
Forgings, plain	666	645	1,681	2,092
Forgings, alloy steel, incl. stainless	349	36	429	136
Castings and forgings	*6,304*	*4,503*	*16,654*	*15,075*
Total	474,360	526,833	1,196,722	1,573,767

Steel Imports by U. S. Gain 10% in First Quarter

MARCH imports of iron and steel products by the United States totaled 24,589 gross tons valued at $1,478,663, compared with 17,736 tons ($1,236,673) in February, according to preliminary figures of the Bureau of Foreign and Domestic Commerce. This trade in March, 1938, amounted to 11,600 tons valued at $989,755.

Imports for the first three months of 1939 totaled 66,656 tons valued at $4,444,481 compared with 60,598 tons valued at $4,085,398 for the first quarter of 1938, and structural shapes, amounting to 3865 tons, were the principal product imported in March. Pig iron receipts, six times as large as in February, totaled 3658 tons including 2714 tons from The Netherlands, 800 tons from British India and 144 tons from Canada.

Belgium was the chief source of iron and steel imports in March with 6871 tons while second place went to Germany with 4537 tons. Imports of scrap in March totaled only 780 tons valued at $11,927 in comparison with 1413 tons valued at $22,568 in February. In the first three months of 1939, 5526 tons of scrap were imported against 449 tons in the like period of 1938.

Iron and steel exports from the United States in March aggregated 162,098 gross tons compared with 134,321 tons in February.

March Imports of Iron and Manganese Ores

(In Gross Tons)

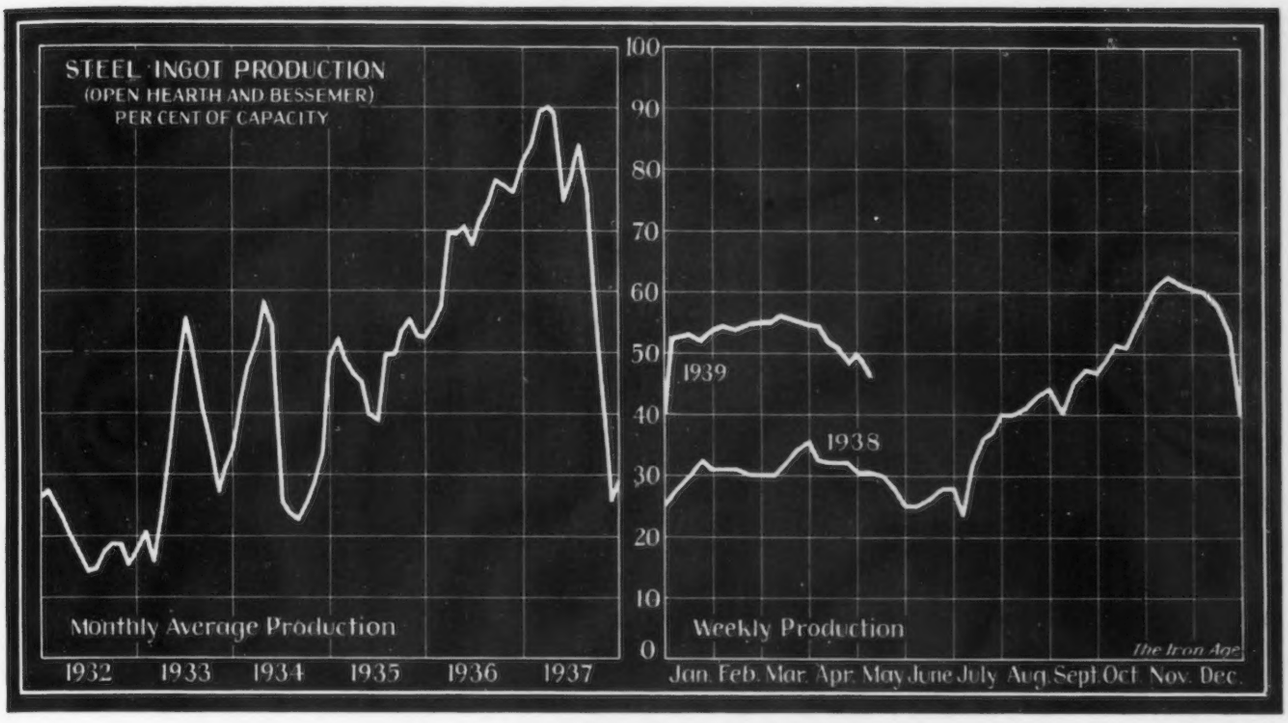
	Iron Ore	Manganese Concentrates, 35 Per Cent or Over
Canada	60	....
Cuba	21,049	3,239
Chile	140,550	....
Spain	....	....
Norway	27,717	....
Sweden	6,255	....
French Africa	....	....
Russia	....	4,607
India	....	2,862
Brazil	6,900	....
Gold Coast	....	10,134
Other countries	179	1
Total	202,710	20,843

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

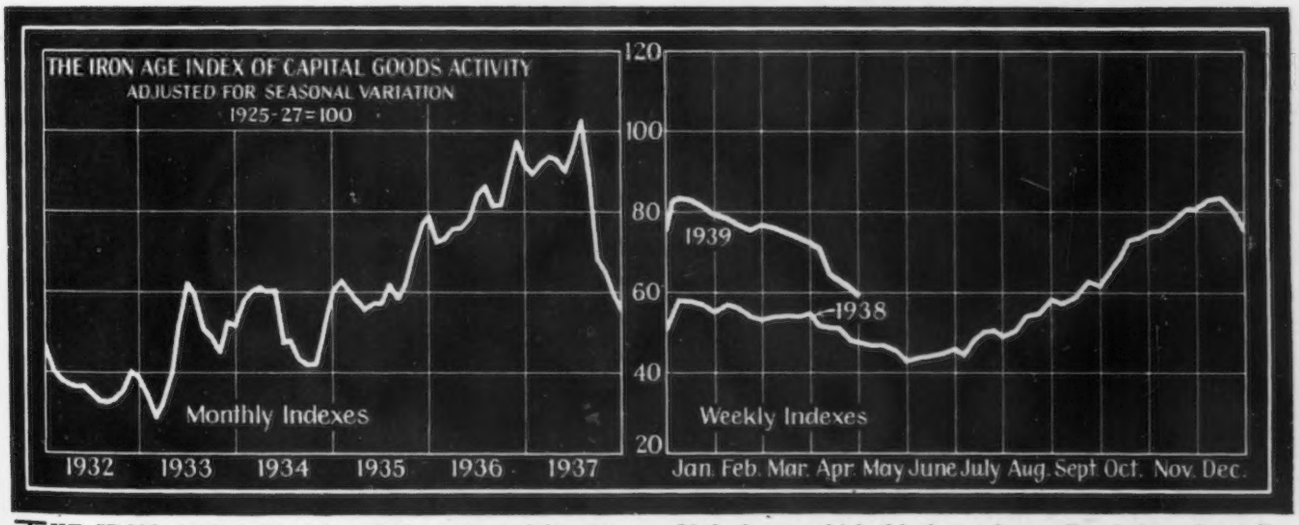
	March		Three Months Ended March	
	1939	1938	1939	1938
United Kingdom	....	....	....	....
British India	800	328	1,401	8,661
Germany	....	....	....	....
Netherlands	2,714	....	3,035	4,260
Canada	144	268	411	776
France	....	....	....	....
Belgium	....	....	....	....
Norway	....	150	....	150
Sweden	....	....	....	....
Russia	....	....	....	....
Other countries	....	....	....	....
Total	3,658	746	4,847	13,847

Ingot Production Drops Two Points to 47%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	36.0	46.0	46.0	33.0	42.0	34.0	59.0	55.0	46.5	49.0	60.0	53.0	50.0	47.0
PREVIOUS WEEK..	44.0	47.0	44.0	33.0	42.0	36.5	59.0	55.0	43.5	49.0	60.0	53.0	50.0	49.0

Weakness in Automobile Output Pushes Index Lower



THE IRON AGE index of capital goods activity declined two points to 59.2 in the past week, the ninth consecutive decline from 76.4 in the week of March 4. A sharp recession in automobile production, which caused a drop of 13.8 points in this series (before seasonal adjustment) as compared with a normal seasonal decrease of 2.8 points, was largely responsible for the week's loss in the combined index. The coal strike continues to depress the Pittsburgh factor, but it is believed that the primary decline of business there, due to the cessation of coal mine operations, has about run its course and future changes in activity will be of minor proportions. The direct influence of the coal situation is felt in the Pittsburgh series, so far as THE IRON AGE index is concerned. If the losses which this factor has suffered since the strike was inaugurated were discounted, the combined index would stand at 64.5 as against 70.7 a month ago, indicating that there has also been substantial declines in the other phases of heavy goods production.

	Week Ended May 6	Week Ended Apr. 29	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	62.2	61.1	37.8	126.5
Automobile production[2]	59.2	70.3	44.6	128.7
Construction contracts[3]	75.2	75.9	61.6	127.9
Forest products carloadings[4]	51.7	50.4	46.9	117.5
Production and shipments, Pittsburgh District[5]	47.9	48.3	46.0	123.5
Combined index	**59.2**	**61.2**	**47.4**	**124.8**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record;* 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Ingot production lower; 10 more blast furnaces idle.

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. . . Weakness in sheet prices adds to other uncertainties.

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. . . Britain buys 200,000 tons of scrap; domestic markets steadier.

A DECLINE of eight points in ingot production in the Pittsburgh district, together with minor reductions at Chicago and Buffalo, has brought down the rate for the industry as a whole to 47 per cent from an estimated 49 per cent for last week. On top of a net loss of 21 active blast furnaces in April, there has been a reduction of 10 furnaces so far this month. Of these, three are in the Pittsburgh district, three in the Chicago district, two in the Birmingham district, one at Cleveland and one at Buffalo. Some of the stacks were banked and some were blown out. United States Steel units account for six of the idle furnaces.

Reduction in output of steel and pig iron has been dictated partly by a smaller demand for steel and partly by efforts to conserve coal and coke in the event that the coal miners' strike is not quickly ended. In a good many instances steel consumers have held up shipments of steel from the mills in evident fear that their own operations may be curtailed by coal shortage. Routine buying of material by railroads for car repairs has virtually ceased.

Another factor in the withholding of orders by steel buyers is their uncertainty as to the future course of prices, which in isolated instances have weakened, particularly on sheets. In Detroit there have been concessions of $4 a ton, but this has been for prompt shipment only and the tonnage involved was small. However, price weakness has not been entirely confined to that district. A Government arsenal in the East received bids on galvanized sheets $4 a ton under the regular market. None of the larger producers has openly taken cognizance of these concessions, but most of them are meeting competition.

The downward trend in steel production, automobile assemblies and carloadings in particular has brought the ninth consecutive weekly decline in THE IRON AGE capital goods index, which for this week stands at 59.2 against 76.4 in the week of March 4. The index figure for the comparable week in 1938 was 47.4.

Ingot production dropped 12 per cent in April, having totaled 2,986,985 gross tons last month compared with 3,396,021 tons in March.

Automobile assemblies declined sharply last week and will undoubtedly continue to drop until production of 1940 models is well under way. There will be some partial shutdowns of automobile manufacturing facilities beginning this week. Some small experimental orders for steel for 1940 models are now being rolled, but it is not likely that large-scale production of the new cars will come before July. Meanwhile, there are ample field stocks of 1939 models.

The volume of new orders for virtually all steel products excepting structural steel, reinforcing bars and tin plate has been slowly but steadily declining over the past few weeks. Considering the state of uncertainty caused by a combination of disturbing influences, it is surprising that business is as good as it is. Two favorable underlying factors are the absence of large inventories and the fact that orders are numerous though individually small.

THE most important activity of the past week was in fabricated structural steel, awards of which totaled nearly 29,000 tons. The largest letting was 14,000 tons for a bridge across the Susquehanna River at Havre de Grace, Md., which went to the Bethlehem Steel Co. Other sizable lots were 4000 tons for a section of the Delaware aqueduct, New York, and 2250 tons for an apartment building in Philadelphia. Reinforcing steel awards were also fairly large at more than 10,000 tons, including 3000 tons for a section of the East River Drive, New York. New reinforcing steel projects total 13,600 tons.

In railroad equipment the outstanding order was for 31 diesel locomotives, placed by the Santa Fe.

Export orders are showing a rising trend, particularly from South America, owing to the inability of British and German mills to make early deliveries. Great Britain's need for scrap has resulted in the purchase of an additional 200,000 tons in the United States.

Despite the absence of important scrap buying by domestic mills, there have been no further important declines in prices. THE IRON AGE scrap composite price is unchanged at $14.25.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	May 9, 1939	May 2, 1939	Apr. 11, 1939	May 10, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	...
Cents Per Lb.:	May 9, 1939	May 2, 1939	Apr. 11, 1939	May 10, *1938
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.30	3.30	3.30	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.84
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.34
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.14	30.34
Ferromanganese, seab'd carlots	80.00	80.00	80.00	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$14.75	$14.75	$15.75	$11.75
Heavy melting steel, Phila.	15.25	15.25	15.75	12.25
Heavy melting steel, Ch'go	12.75	12.75	13.75	11.25
Carwheels, Chicago	12.50	12.50	13.00	13.00
Carwheeels, Philadelphia	16.00	16.00	16.75	14.75
No. 1 cast, Pittsburgh	15.25	15.25	15.50	14.25
No. 1 cast, Philadelphia	*16.25*	16.50	16.75	14.75
No. 1 cast, Ch'go (net ton)	11.75	11.75	12.25	10.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.00
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, electrolytic, Conn.	*10.00*	10.25	10.75	10.00
Copper, lake, New York	*10.00*	10.25	10.75	10.125
Tin (Straits), New York	49.25	49.25	45.95	38.00
Zinc, East St. Louis	4.50	4.50	4.50	4.00
Zinc, New York	4.89	4.89	4.89	4.39
Lead, St. Louis	4.60	4.60	4.60	4.35
Lead, New York	4.75	4.75	4.75	4.50
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.75

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
May 9, 1939	2.286c. a Lb.	$20.61 a Gross Ton	$14.25 a Gross Ton
One week ago	2.286	20.61	14.25
One month ago	2.286	20.61	15.08
One year ago	2.512	23.25	11.75

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939			$23.25, June 21	$19.61, July 6	$15.29, Mar. 28	$14.25, May 2
1938	2.512c., May 17	2.211c., Oct. 18	23.25, Mar. 9	20.25, Feb. 16	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	19.73, Nov. 24	18.73, Aug. 11	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	18.84, Nov. 5	17.83, May 14	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	17.90, May 1	16.90, Jan. 27	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	16.90, Dec. 5	13.56, Jan. 3	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	14.81, Jan. 5	13.56, Dec. 6	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	15.90, Jan. 6	14.79, Dec. 15	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	18.21, Jan. 7	15.90, Dec. 16	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.71, May 14	18.21, Dec. 17	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.59, Nov. 27	17.04, July 24	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10			16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

STEEL OPERATIONS

. . . Pittsburgh rate drops sharply to 36% . . . Industry down to 47%

PITTSBURGH steel output is down eight points this week to 36 per cent. Much of the decline can be accounted for by the shutting down of one plant to accumulate orders. Operations at another works have been reduced to an exceptionally low point because certain tonnage is not needed by consumers at the present time. Both of these moves are linked with coal conservation measures, but the falling off in demand in the past two weeks has also been a contributing factor.

There is no evidence yet of steel ingot output being affected by actual shortage of coal as most of the declines which have occurred recently may still be classified as resulting from precautionary measures against a long coal strike. Unless the impasse is settled within the next few weeks, it is a foregone conclusion that at least part of the steel industry will face acute shortages of coal both for coke making and for steam production.

As a result, largely of the decline at PITTSBURGH, together with lesser declines in the CHICAGO and BUFFALO districts, the rate for the entire industry is down two points this week to 47 per cent, an estimate which coincides precisely with that of the American Iron and Steel Institute issued on Monday. CHICAGO dropped only one point to 46 per cent while BUFFALO is off two and a half points to 34 per cent. There was a gain of three points in the BIRMINGHAM district to 46½ per cent and one of two points in the YOUNGSTOWN district to 46 per cent. Other districts are unchanged from last week's rates.

Pig iron production is being curtailed sharply. Since May 1 at least eight blast furnaces have been banked or blown out on top of the net loss of 21 last month. The Carnegie-Illinois Steel Corp. has banked three in the PITTSBURGH district, has banked one and blown out one in the CHICAGO district, Inland Steel has banked one, Republic Steel Corp. has banked one in the BIRMINGHAM district. A CLEVELAND district furnace has also been taken off.

NEW BUSINESS

. . . General trend still downward excepting structural and tin plate

TOTAL steel bookings at PITTSBURGH declined moderately last week with the leveling off apparent in all steel products except structural and tin plate specifications. The presence of several crises all acting simultaneously precludes a pickup in steel business in the immediate future.

In the CHICAGO district business generally is running behind that of April. One sales office, by virtue of a few non-recurring orders, booked twice as much tonnage in the first week of May as in the same period of the previous month but its other business showed no such upward trend, and weekly totals are expected to return to the mediocre levels of previous weeks.

Because of the coal strike, foundry coke shipments to CHICAGO consumers are 40 per cent ahead of a month ago, but this is no reflection of general business conditions at foundries.

Several thousand railroad cars are pending but it is not known if any of these will be ordered this quarter. The Great Northern rail order may be the last of importance for some time.

CHICAGO business leaders are vitally interested in construction currently and a move is under way to interest capital in a local building drive.

At CLEVELAND and YOUNGSTOWN there has been very little of an interesting nature in new business for steel producers recently. Orders remain numerous though individually small, and the accumulation when totaled often surprises sellers.

Probably of all products, tin plate specifications are the most encouraging. Specifications from canners for their needs beyond July are expected to come out soon. Export demand for tin plate is good from South America and Europe. Mechanical hot mill operations have picked up.

Inquiries during the past week show automotive buying has not ceased entirely, but how much tonnage can be counted upon is in doubt.

With the beginning of the construction season for private industry in the SAN FRANCISCO area, prospects are encouraging. Four private plants and two large apartment houses are on the books at present. Structural tonnage is holding well ahead of 1938.

In the NEW YORK and PHILADELPHIA markets orders have declined in the past week. Most of the orders are small, fill-in lots.

PRICES

. . . Concessions on sheets more common up to $4 a ton

CONCESSIONS in the price of hot and cold rolled sheets and strip are more prevalent than a week ago. The condition has not become general, however. While most of the weakness has occurred in the DETROIT district, it is not necessarily restricted to that area. Reliable information indicates that cuts of $4 a ton have been made from the published price but in these cases material has been sold on a spot basis for prompt rolling at the mill's convenience. It has been learned further that tonnages involved on these orders are not large and the provision of prompt rolling at mill's convenience seems to indicate that no blanket tonnages have been placed.

No heavy bookings of sheets and strip have resulted from the current spottiness in prices. It is a foregone conclusion, however, that if substantial tonnages of sheets and strip are purchased at less than the market price, all major steel producers will participate as rapidly as the break has been uncovered. Meanwhile, all companies are meeting competition when encountered.

The recently revised quantity setup continues to be handled very loosely and the mean weight method of selling steel sheets, which was to have been thrown overboard May 1, is still in effect.

On open bids to the Picatinny Arsenal, Dover, N. J., two or three mills quoted 3.30c. per lb., Sparrows Point, on galvanized sheets, or $4 a ton below the current published price.

PIG IRON

. . . Three steel company furnaces banked to conserve coke

CONSERVATION of coal and coke continues to exert an influence on pig iron production by steel companies, though merchant furnaces apparently have not been affected thus far, and there are ample stocks of iron for foundry use.

The Carnegie-Illinois Steel Co. has banked three additional blast furnaces in the PITTSBURGH district and banked one and blew out another in the CHICAGO district. Inland Steel Co. also banked one furnace. Other companies are keeping a close control over pig iron production.

There has been more activity during the past week in coke than in pig iron. For example, in the CHICAGO district coke shipments during the first seven days of May were 40 per cent above those of the same period in April. This improvement in coke shipments is believed to be directly a result of the coal situation and not due to a larger melt. During the same period pig iron shipments from CHICAGO furnaces gained 18 per cent. In the ST. LOUIS district there has been a definite improvement in the melt, partly due to increased activity among stove plants which are working on fall stocks. Shipments to consumers in the ST. LOUIS area have gained in the past two weeks. Elsewhere there is little or no change.

Regular users of by-product coke are not being asked to pay a premium, but those who regularly use beehive coke and are now forced to buy by-product coke are being quoted prices which are usually 50c. a ton higher.

An order for several thousand tons of pig iron is understood to have been placed recently by Swedish interests with a producer on the Great Lakes. Direct shipment is planned in one of the small ocean freighters which visit the Great Lakes regularly.

A rail rate reduction to $6.60 per ton on pig iron between CLEVELAND and WORCESTER, Mass., which recently was put through by the Interstate Commerce Commission, apparently will have only small effect upon the present method of moving steel making iron between Cleveland and the Worcester plant of the American Steel & Wire Co. Most of the pig iron is moved by barge on contract rates. Heaviest yearly recent movement occurred in 1936 when around 35,000 tons of pig iron was shipped, but some of this is understood to be still in stock at the Worcester plant, which has been using scrap more heavily in the last few years.

Originally the railroads sought a rate of $5.50 per ton and about a year ago revised this request to $6.05. The previous all-rail rate from Cleveland was $7.34. Under the decision granting a rate of $6.60, the long and short haul provisions of the Interstate Commerce Act need not be observed. The reduced rate was predicated on the existence of a $5.48 tariff by water-rail routes.

Industry Speaks

B. C. HEACOCK, president, Caterpillar Tractor Co.—"Fix it so the Labor Board can't continue to be prosecutor, judge, jury and hangman."

H. W. PRENTIS, Jr., president, Armstrong Cork Co.—"The road to planned economy is the road to state socialism—state ownership of the means of production. Once state socialism is a reality, what becomes of the other two legs of the tripod of freedom — representative democracy and religious liberty?"

JAMES A. FARRELL, former president, U. S. Steel Corp.—"The most we can do as a nation is to organize our economic forces behind our foreign trade and induce other nations to combine with us in defending international commerce."

Industry Listens

"Appeasement was created by our opponents, quite deliberately created, I think. Certainly the administration wants to see business go ahead."—SECRETARY OF COMMERCE HOPKINS.

"I never interpret. The only times I have gotten into trouble have been those in which I have attempted to interpret."—SECRETARY OF LABOR PERKINS.

"For every dollar spent on payrolls another 43c. is spent on taxes, which average about $486 for each employee. It is therefore not difficult to understand why industry hesitates to employ additional workmen and enlarge upon present payrolls."—MATTHEW WOLL, vice president, American Federation of Labor.

RAILROAD BUYING

. . . Sante Fe orders 31 Diesel electric engines

CLOSE to 670,000 gross tons of rails have been placed with various steel companies for 1939 delivery. A rough estimate indicates that about 40 per cent of this tonnage has been rolled, with the balance to be produced some time within the next three months. Total rail orders booked so far have been below earlier expectations, which is probably due to the change in the general business outlook since the first of the year. Any sharp improvement in business conditions later in 1939 might result in additional rail tonnage.

Purchases of rolling stock in April by domestic railroads totaled 2695 freight cars, 19 diesel-electric locomotives and 14 passenger-train cars, according to *Railway Age*. These compare with 1000 freight cars, 63 locomotives and 60 passenger-train cars in the preceding month. Purchases for the year through April amount to 5702 freight cars, 93 locomotives and 121 passenger-train cars, as against 819 freight cars, 39 locomotives and 52 passenger-train cars in the comparable period of 1938.

The Santa Fe has ordered 30 1000-hp. diesel electric switch engines, and one 4000-hp. diesel electric passenger locomotive, and is asking bids on 11 light-weight passenger cars of various types. The passenger locomotive and 13 of the switchers have been ordered from Electro-Motive Corp., La Grange, Ill.; 12 switchers will be built by American Locomotive Co., Schenectady, N. Y., and five switchers were awarded to the Baldwin Locomo-

tive Works, Eddystone, Pa. Cash will be paid for all the new equipment, which will give the Santa Fe a total of 64,900 diesel-electric horsepower, the largest amount of power of this type of any railroad in the world. The cost will approximate $3,750,000.

Other equipment orders include three 20,000-gal. locomotive tenders ordered from the American Locomotive Co. by the Lehigh Valley and six flat cars for the U. S. Navy purchased from the Greenville Steel Car Co.

The Chicago & North Western is seeking court approval of a budget of $74,484,000 for the last nine months of the present year. New equipment covered by the budget includes 500 70-ton coal cars 300 50-ton box cars and 20 streamlined passenger cars. Estimated cost of this equipment is $4,010,000.

The 1000 Great Northern cars being constructed by Pullman-Standard Car Mfg. Co. will require only about 10,000 tons of steel, since sides are to be of wood. The steel roofs and car ends are being furnished by Standard Railway Equipment Co., while Pullman will provide the wheels and underframes. The 1500 tons of axles have been ordered.

The Mobile & Ohio has been authorized to buy 1000 tons of rails and fastenings.

The a.c.f. Motors Co. announces receipt of orders for 27 motor coaches. Ten are for North Boulevard Transportation Co., North Bergen, N. J.; five for Boston & Maine Transportation Co., Boston; five for Wyoming Valley Autobus Co., Wilkes-Barre, Pa.; four for Florida Motor Lines, Jacksonville, Fla.; two for Scranton Transit Co., Scranton, Pa., and one for Vermont Transit Co., Burlington, Vt.

REINFORCING BARS

. . . East River Drive, housing projects feature dull market

CONTRACTS let the past week included 3000 tons to Carnegie-Illinois Steel Corp. for a section of the East River Drive, New York City; 2741 tons to Ceco Steel Products Co., Chicago, for the second section of the Chicago subway, and 2100 tons to Connor Steel Co., Birmingham, for a New Orleans housing project.

Housing projects are prominent in new business. The Glenwood Avenue housing development at Philadelphia will take 1300 tons and a Louisville, Ky., housing project will require 1000 tons. The seventh section, Chicago subway, will need 3350 tons and 1700 tons of reinforcing steel will be used in another section of the East River Drive, New York.

The WEST COAST finds increased industrial building activity heartening and CHICAGO reports fabricators mildly optimistic and the volume of small jobs holding. In the PHILADELPHIA district Bates & Rogers Construction Co. is low bidder on the Kittatiny and Blue Mountain tunnels, involving 1400 tons.

BOLTS, NUTS AND RIVETS

. . . Business lagging but improvement is expected

CLEVELAND reports that practically all divisions are trailing along on reduced schedules similar to consumers of bolts, nuts and rivets. Some executives are hopeful for an upturn late this month or early in June. At least part of the present uncertainty is believed due to psychological factors accompanying the coal strike.

PLATES

. . . Coal situation has affected railroad purchases

RAILROAD buying of plates, which had been in fair volume, has been materially reduced by the coal situation. Up to this week some of the mills in the Central district had enjoyed fairly good schedules. A CLEVELAND plate mill ceased rollings this week for the first time in six weeks.

Business in the EAST has seemingly been affected to some extent by the uncertainty among buyers as to the actual price situation. A bid to a railroad a few weeks ago by a Pennsylvania mill at $2 a ton under the regular market has had an upsetting influence.

At CHICAGO the principal plate buying has been for a part of the cars recently ordered by the Great Northern. Tonnages for car repairs are unimpressive in that district.

The Bureau of Reclamation has awarded a contract for supplying plates to be used in the installation of the large gates which will control the flow of the Columbia River at the Grand Coulee Dam to the American Bridge Co. on its bid of $70,245. It was stated that the company expects to ship the gates from Gary, Ind.

STRUCTURAL STEEL

. . . 14,000-ton Maryland bridge contract is awarded

AWARDS were higher this week in the EAST with 14,000 tons for the Havre de Grace, Md., bridge going to Bethlehem Steel Co. and 2250 tons for a Philadelphia apartment building going to Fort Pitt Bridge Co., Pittsburgh, while Carnegie-Illinois Steel Corp., through Dravo Corp., general contractors, will provide 4000 tons of miscellaneous structural shapes for section 319, Delaware Aqueduct.

Most districts, however, reported a sharp decline in the number of awards and of new projects, particularly at CHICAGO and BOSTON. In the PHILADELPHIA area, the Pennsylvania Turnpike Commission will take bids May 19 on the Tuscarora Mountain and Ray's Mountain tunnels, involving a moderate size tonnage. In parts of the Midwest, residential building is a bright spot.

Pending business includes 3200 tons of steel for the William Howard Taft high school at Bronxville, N. Y. Low bids on the Ballard Bridge approach, Seattle, indicate that 1500 tons of structural steel, rather than concrete bars, will be required. The Dayton Avenue bridge at Los Angeles will take 1300 tons. Successful financing of a San Francisco apartment house may bring a large tonnage on the market.

MERCHANT BARS

. . . Demand picks up slightly

. . . Tractor requirements help at Chicago

THE slight pickup in miscellaneous bar business within the past week raised total bookings at PITTSBURGH a shade above the previous week's level. Total specifications, however, are somewhat below the volume of two months ago. Numerically, orders are not off much but individual tonnages have contracted considerably.

One CHICAGO office reports the best week in some time, largely because of bar orders from two tractor plants in that territory. Other usually good customers, such as automobile plants and parts suppliers, jobbers, makers of farm implements, exclusive of tractors, and a host of miscellaneous buyers, are tapering off at present. A substantial pickup in bar demand is not expected until 1940 model activity

begins in Detroit, which may be early in June.

At CLEVELAND and YOUNGSTOWN the month has started out very similar to April. Orders are individually small and well diversified. Practically all are accompanied by urgent requests for immediate shipment. Some merchant bar sellers look for improvement in four to six weeks.

SEMI-FINISHED STEEL

. . . Demand tapers . . . Tin bars most active item

DEMAND tapered off in the past week, some of the decline being attributed to coal conservation measures at consumers' plants. Tin bars remain the most active item on the semi-finished steel list.

TUBULAR GOODS

. . . Oil country buying is slow . . . Merchant pipe fairly active

TOTAL sales at PITTSBURGH are in no better volume than a week ago. Oil country goods specifications continue at an exceptionally low rate. Merchant pipe business, while showing no improvement from a few weeks ago, remains about the most active item on the pipe list. Merchant pipe prices continue spotty at some locations throughout the country, particularly in the NEW YORK area, where resale prices are being cut as much as 20 per cent.

At CLEVELAND and YOUNGSTOWN the over-all picture in tubular goods is described as fair. With drilling going forward better, casing orders are slightly ahead of one month ago. Standard pipe continues in fair demand.

Market Sidelights

The Bureau of Reclamation has awarded a $1,454,700 contract to the Westinghouse Electric & Mfg. Co. for supplying two 82,500 kva. generators to be installed at the Boulder Dam power house.

* * *

Indicative of the active demand for specially treated steel, partly emanating from the aircraft industry, a heat-treating plant in the Pittsburgh district is understood to have a backlog of around six weeks.

* * *

Chicago steel mills have sufficient coal at present operating rates to last 30 to 60 days. Though 18,000 non-CIO miners are still at work in the Illinois fields, this coal is useless for coking purposes, and not much good for steam plants, its chief value being for domestic use. It is said that these miners can supply Chicago with all the coal it will need.

WIRE PRODUCTS

. . . Volume of buying shows a decline

DEMAND for both manufacturers' wire and merchant wire products at PITTSBURGH eased off to some extent in the past week. The general state of uncertainty induced by the mine strike and other factors is credited for the poor volume of wire business. Jobber business in the western Pennsylvania mining sections has been severely hit by the mine tie-up which, in turn, is being reflected on mill order books.

CHICAGO wire sellers, though fairly well occupied with farm demand for merchant products, are reporting little activity in industrial wire lines. A decided impetus will be given this branch of the business when 1940 motor car production gets underway, as many of the wire companies' good customers supply the automobile industry with parts and accessories.

With demand for merchant wire products beginning to taper and road requirements light, CLEVELAND producers are frank to state the outlook for the next few weeks is not exceptionally bright. However, it is generally expected production will approximate the April level. Better export business has been noted recently.

TIN PLATE

. . . Operations continue at 70% . . . Outlook improving

TIN plate operations this week are estimated at 70 per cent, unchanged from a week ago. Both general line can and sanitary can specifications have improved lately and with the approach of the active packing season, producers look for even greater activity. A prolongation of the coal tie-up, however, may have some effect on consumers' plants and to a lesser extent may curtail operations at non-integrated tin plate companies.

A large can company has instructed steel companies to roll all of its tin plate orders on their books as soon as possible and is said to be of the opinion that midsummer can requirements will be fairly large.

IRON ORE

. . . Prices unchanged from last year . . . First 1939 sales made

Lake Superior iron ore prices are being carried forward unchanged from last year. According to an announcement May 3, first large sales of the 1939 season were consummated by a Cleveland ore firm. Old range bessemer is $5.25 per gross ton delivered lower Lake ports; old range non-bessemer is $5.10, Mesabi bessemer is $5.10; Mesabi non-bessemer $4.95, and high phosphorus iron $4.85.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	May 9, 1939	May 2, 1939	Apr. 11, 1938	May 10, 1938	1939	1938
Fabricated structural steel awards	28,650	11,950	23,925	14,950	379,260	255,475
Fabricated plate awards	310	17,470	3,470	2,820	67,495	50,210
Steel sheet piling awards	2,775	0	4,060	0	21,340	8,750
Reinforcing bar awards	10,350	19,250	4,800	5,910	180,595	82,355
Total Letting of Construction Steel..	42,085	48,670	36,255	23,680	648,690	396,790

IRON AND STEEL SCRAP

. . . European scrap cartel places upward of 200,000 tons with U. S. brokers, with more to come this week . . . Composite unchanged at $14.25.

MAY 9—Most markets are quiet, and in the absence of any real test, prices are generally unchanged. Because of this static condition in the principal markets, THE IRON AGE composite price is unchanged from last week at $14.25. In the Valley, a 25c. decline in the whole list is expected to mark the end for the present of the precipitous decline that started four weeks ago and has brought the price of No. 1 steel to consumers there down $1.50 from a $16 top. Some weakness is seen at St. Louis, where an expected mill purchase is being held up because of the coal shortage, and for similar reasons Cincinnati dealers have lowered their buying prices. Generally, too, curtailment in blast furnace operations due to the coal situation and the state of domestic business has tended to weaken blast furnace material.

At London last Saturday, the International Scrap Convention ordered about 200,000 tons of scrap from American brokers on top of about 100,000 tons placed with American brokers a month ago. Continuance of negotiations is expected to bring out further business before the end of this week. Export prices continue as before, with $15 f.a.s. being paid for No. 1 steel.

Pittsburgh

The market is not much if any softer than a week ago and No. 1 heavy melting steel remains quotably unchanged at $14.50 to $15. Some exceptionally small tonnages have moved to consumers at $14.50 a ton, but other points in the district continue to pay between this figure and $15 a ton. Some brokers are able to pick up scattered cars at slightly less than $14.50 a ton, but the market lacks complete testing owing to the lack of transactions on the part of both brokers and consumers.

Chicago

This market continues very quiet in the absence of mill buying. Covering on the last mill sale at $13 proceeds at $12.75 and slightly less. The Chicago & North Western sold a tonnage of heavy melting steel last week at a little above $13, which would indicate that the next consumer purchase might be at a reduction from the present quoted prices.

Philadelphia

Little if any new business was placed by domestic mills during the week, and deliveries on old orders are spotty and in very poor volume. Foundry grades likewise are spotty, and reroll specialties are practically inactive. Although district steel making operations appear to be firmer, it is probable that little interest will be displayed in new commitments for some weeks to come. Meanwhile, the export market continues to dominate this district. Two boats are in Port Richmond now, and total clearances from Port Richmond during May will certainly approximate 30,000 tons—this tonnage is particularly surprising in view of the comparatively high prices prevailing in this territory. Export prices are steady as quoted, although in general the lower quotation of each range of prices is the figure most representative of recent transactions.

Youngstown

Valley mills continue to take in a little scrap. With this week's 25c. decline in quotations, the market decline is believed to be about completed. Little change is expected unless steel operations undergo another good-sized drop, which appears unlikely at this time.

Cleveland

Except for a 25c. decline in borings and turnings, the market is unchanged in published quotations this week. The movement is toward the Valley. The principal railroad list is understood to have brought about the same prices that prevailed last month, most of the scrap going for export. Dealer yards are in fair shape, somewhat better than a year ago from the standpoint of reduced inventories. There is talk of exporting No. 2 bundles direct from the Great Lakes by ocean-going freighters.

Buffalo

The largest consumer in the district dropped its bidding price 50c. this week when it purchased 1000 tons of No. 2 bundles at a price which would indicate $13 to $13.50 for No. 1 heavy melting steel, if the usual differential were applied. At the same time a smaller sale of No. 2 heavy melting steel was made to another mill at a price reported to be $12 to $12.50. Shipments at one mill are being held up until late in the month.

St. Louis

Because of the fear of a coal strike, a pending deal with a district mill for the purchase of a round tonnage of scrap has been held up. Selected heavy melting and No. 2 heavy melting are 25c. a ton off and No. 1 railroad wrought is 50c. lower. Railroad lists: Wabash, 3500 tons; New York, Chicago & St. Louis, 1700 tons; Missouri Pacific, 1600 tons; Gulf Coast Lines, 700 tons and Ann Arbor, 600 tons.

Cincinnati

The old materials market is depressed by the coal strike and foreign conditions. Dealer activity is small and trading light. Movement on contract is lighter, with further decline likely unless the coal situation eases. Prices are weaker and no tendency to buy except on a "bargain" basis is noticeable.

Detroit

Most of the scrap activity in this area centers around the demands of foundries for cast iron. Production of dies for 1940 automobile models accounts for most of this activity. Blast furnace scrap is not moving at all and sales of open-hearth material have been lacking. Despite continued gloom among brokers and dealers, there is no justification for changing prices.

New York

Contracts for upward of 200,000 tons of scrap iron and steel were placed with American scrap brokers last Saturday by the International Scrap Convention in London. Prices were the same as on previous commitments in recent months, namely, about $15 for No. 1 heavy melting steel and $13.50 for No. 2, f.a.s., with premiums being paid for small tonnages of specialties. Negotiations are still going forward with representatives abroad and it is likely that additional contracts will be placed before the week is out. The last purchase from the United States took place about a month ago, about 100,000 tons being involved, following closely on the heels of extensions made to earlier commitments. Export buying prices in the New York area are unchanged. Domestic buying prices are also unchanged and the market is flat.

Toronto

Iron and steel scrap markets show little change for the week. Local dealers state that the big consumers in the Hamilton area are reluctant to pay the prevailing prices for heavy melting steel and at least one has cut its buying prices 50c. a ton. Dealers, however, are holding quotations at the reecntly announced advance, although a few appear to be a little shaky with regard to the future. Little new business is reported and most deliveries by dealers are against short term contracts.

Boston

Exporters' efforts to buy No. 1 steel for less than $14 a ton delivered dock, and No. 2 steel for less than $12.75 having met with comparatively little success, the market is firmer because no sale of No. 1 is reported at less than $13.75 a ton and quite a few at $14, and no sale of No. 2 at less than $12.75. Current export buying is against old contracts. Two boats are loading here. Their aggregate cargoes will be about 12,000 tons. The Weirton Steel Co. has reentered the market for bundled skeleton on a basis of $7.15 a ton on cars, down 75c. from its last previous purchase. No skeleton sales are reported, however, and the domestic scrap market generally is practically at a standstill.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.50 to $15.00
Railroad hvy. mltng...	15.50 to 16.00
No. 2 hvy. mltng. steel.	13.00 to 13.50
Scrap rails	16.00 to 16.50
Rails 3 ft. and under..	18.00 to 18.50
Comp. sheet steel	14.50 to 15.00
Hand bundled sheets..	13.50 to 14.00
Hvy. steel axle turn..	13.00 to 13.50
Machine shop turn....	9.00 to 9.50
Short shov. turn.....	10.00 to 10.50
Mixed bor. & turn.....	7.50 to 8.00
Cast iron borings	8.50 to 9.00
Cast iron carwheels...	15.00 to 15.50
Hvy. breakable cast...	12.00 to 12.50
No. 1 cupola cast.....	15.00 to 15.50
RR. knuckles & cplrs..	17.00 to 17.50
Rail coil & leaf springs	17.50 to 18.00
Rolled steel wheels....	17.50 to 18.00
Low phos. billet crops.	18.50 to 19.00
Low phos. punchings..	17.00 to 17.50
Low phos. plate	16.00 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.00 to $15.50
No. 2 hvy. mltng. steel.	13.00 to 13.50
Hydraulic bund., new.	$14.50 to 15.00
Hydraulic bund., old..	11.00 to 11.50
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels...	.... 16.00
Hvy. breakable cast...	15.00 to 15.50
No. 1 cast	16.00 to 16.50
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable ...	15.50 to 16.00
Machine shop turn....	8.50 to 9.00
No. 1 blast furnace....	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings..	10.00 to 10.50
No. 1 low phos. hvy...	17.00 to 17.50
Couplers & knuckles..	17.00 to 17.50
Rolled steel wheels....	17.00 to 17.50
Steel axles	20.00 to 20.50
Shafting	20.50 to 21.00
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire.....	12.00 to 12.50
Cast borings (chem.)..	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$12.50 to $13.00
Auto. hvy. mltng. steel alloy free	11.25 to 11.75
No. 2 auto steel	10.50 to 11.00
Shoveling steel	12.50 to 13.00
Factory bundles	11.75 to 12.25
Dealers' bundles	10.75 to 11.25
Drop forge flashings...	9.25 to 9.75
No. 1 busheling	11.25 to 11.75
No. 2 busheling, old...	5.25 to 5.75
Rolled carwheels	14.50 to 15.00
Railroad tires, cut ...	14.50 to 15.00
Railroad leaf springs..	14.50 to 15.00
Steel coup. & knuckles	14.50 to 15.00
Axle turnings	11.50 to 12.00
Coil springs	16.00 to 16.50
Axle turn. (elec.).....	13.00 to 13.50
Low phos. punchings..	15.50 to 16.00
Low phos. plates 12 in. and under	15.00 to 15.50
Cast iron borings	5.50 to 6.00
Short shov. turn.....	6.00 to 6.50
Machine shop turn....	6.00 to 6.50
Rerolling rails	16.50 to 17.00
Steel rails under 3 ft..	15.50 to 16.00
Steel rails under 2 ft..	16.00 to 16.50
Angle bars, steel	15.00 to 15.50
Cast iron carwheels ...	12.25 to 12.75
Railroad malleable	14.50 to 15.00
Agric. malleable	10.75 to 11.25
	Per Net Ton
Iron car axles	$18.00 to $18.50
Steel car axles	17.50 to 18.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast.	11.50 to 12.00
Clean auto. cast	12.50 to 13.00
No. 1 railroad cast....	10.50 to 11.00
No. 1 agric. cast	10.00 to 10.50
Stove plate	7.25 to 7.75
Grate bars	7.75 to 8.25
Brake shoes	9.00 to 9.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.00
No. 2 hvy. mltng. steel.	13.00 to 13.50
Low phos. plate	15.00 to 15.50
No. 1 busheling	13.25 to 13.75
Hydraulic bundles	13.50 to 14.00
Machine shop turn....	8.00 to 8.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel	12.00 to 12.50
Comp. sheet steel	12.50 to 13.00
Light bund. stampings	9.50 to 10.00
Drop forge flashings..	11.00 to 11.50
Machine shop turn....	7.00 to 7.50
Short shov. turn.....	7.50 to 8.00
No. 1 busheling	12.50 to 13.00
Steel axle turnings....	10.50 to 11.00
Low phos. billet and bloom crops	17.50 to 18.00
Cast iron borings	7.25 to 7.75
Mixed bor. & turn....	7.25 to 7.75
No. 2 busheling	7.25 to 7.75
No. 1 cupola cast	14.50 to 15.00
Railroad grate bars ..	8.50 to 9.00
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.25 to 17.75
Rails for rolling	17.50 to 18.00
Railroad malleable ...	14.50 to 15.00
Cast iron carwheels ..	13.50 to 14.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	11.50 to 12.00
Old hydraul. bundles..	10.25 to 10.75
Drop forge flashings...	11.50 to 12.00
No. 1 busheling	11.50 to 12.00
Hvy. axle turnings....	9.50 to 10.00
Machine shop turn....	6.50 to 7.00
Knuckles & couplers..	16.50 to 17.00
Coil & leaf springs....	16.50 to 17.00
Rolled steel wheels....	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	7.50 to 8.00
Mixed bor. & turn....	6.75 to 7.25
Cast iron borings	6.75 to 7.25
Steel car axles	16.50 to 17.00
No. 1 machinery cast..	15.00 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft..	18.00 to 18.50
Cast iron carwheels...	13.50 to 14.00
Railroad malleable	15.00 to 15.50
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$11.75 to $12.25
No. 1 hvy. melting....	11.50 to 12.00
No. 2 hvy. melting....	10.50 to 11.00
No. 1 locomotive tires.	12.25 to 12.75
Misc. stand. sec. rails.	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	7.00 to 7.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.....	2.50 to 3.00
Machine shop turn....	3.50 to 4.00
Heavy turnings	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Steel car axles	17.00 to 17.50
No. 1 RR. wrought....	9.75 to 10.25
No. 2 RR. wrought....	11.50 to 12.00
Steel rails under 3 ft..	16.00 to 16.50
Steel angle bars	13.00 to 13.50
Cast iron carwheels...	14.00 to 14.50
No. 1 machinery cast..	13.50 to 14.00
Railroad malleable ...	12.25 to 12.75
No. 1 railroad cast....	12.00 to 12.50
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.50 to 10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$10.50 to $11.00
No. 2 hvy. mltng. steel.	8.25 to 8.75
Scrap rails for mltng.	14.00 to 14.50
Loose sheet clippings.	6.00 to 6.50
Hydrau. b'ndled sheets	10.00 to 10.50
Cast iron boring	2.75 to 3.25
Machine shop turn....	4.00 to 4.50
No. 1 busheling	6.75 to 7.25
No. 2 busheling	1.75 to 2.25
Rails for rolling	16.00 to 16.50
No. 1 locomotive tires.	12.75 to 13.25
Short rails	16.75 to 17.25
Cast iron carwheels...	12.00 to 12.50
No. 1 machinery cast..	11.50 to 12.00
No. 1 railroad cast....	11.50 to 12.00
Burnt cast	5.75 to 6.25
Stove plate	5.75 to 6.25
Agricul. malleable	10.25 to 10.75
Railroad malleable	13.75 to 13.25
Mixed hvy. cast	9.50 to 10.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$12.50 to $14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR, wrought	.... 10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	.... 14.50
Tramcar wheels	.... 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$9.50 to $10.00
No. 2 hvy. mltng. steel.	8.50 to 9.00
Borings and turnings..	4.75 to 5.25
Long turnings	4.75 to 5.25
Short shov. turnings..	5.50 to 6.00
No. 1 machinery cast..	12.50 to 13.00
Automotive cast	13.00 to 13.50
Hvy. breakable cast...	9.00 to 9.50
Stove plate	7.50 to 8.00
Hydraul. comp. sheets.	10.50 to 11.00
New factory bushel....	9.50 to 10.00
Sheet clippings	6.75 to 7.75
Flashings	9.00 to 9.50
Low phos. plate scrap.	10.50 to 11.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$11.00 to $11.50
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	10.50 to 11.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR, wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	4.00 to 4.50
Cast borings*	3.50 to 4.00
No. 1 blast furnace....	3.50 to 4.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$9.00
Machine shop turn....	$3.38 to $4.18
Mixed bor. & turn....	2.00 to 2.25
Bun. skeleton long....	.... 7.15
Shafting	.... 15.75
Cast bor. chemical....	4.50 to 5.00
Per gross ton delivered consumers' yards:	
Textile cast	$12.50 to $14.00
No. 1 machine cast....	12.50 to 14.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel.	$11.25 to $11.50
No. 2 steel	10.00 to 10.25

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.00 to $13.00
No. 2 hvy. mltng. steel.	11.00 to 12.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.00	$9.50
No. 2 hvy. mltng. steel.	8.50	8.00
Mixed dealers steel....	7.25	6.75
Drop forge flashings...	9.25	8.75
New loose clippings...	4.75	4.25
Busheling	4.50	4.00
Scrap pipe	5.75	5.25
Steel turnings	5.25	4.75
Cast borings	4.00	3.50
Machinery cast	15.25	14.25
Dealers cast	13.25	12.25
Stove plate	11.25	10.25

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$12.00 to $12.50
No. 2 hvy. mltng. steel.	10.50 to 11.00
No. 2 cast	10.50 to 11.00
Stove plate	9.50 to 10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$13.75 to $14.00
No. 2 hvy. mltng. steel.	.... 12.75
Rails (scrap)	13.75 to 14.00
Mixed textile and machinery cast	12.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$15.00 to $15.25
No. 2 hvy. mltng. steel.	13.50 to 13.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia, delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

Prices on reinforcing bars have been subject to concessions of $3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c.
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	3.10c.
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.30
Woven wire fence, base column	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool...	$2.62
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	$2.80

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	56	36	⅛ & ¼	..+9	+30
¼ to ⅜	.59	43½	½	24	6½
½	.....63½	54	¾	30	13
¾	.....66½	58	1 & 1¼	.34	19
1 to 3	...68½	60½	1½	38	21½
			2	.....37½	21

Lap Weld

2	61	52½	2	.....30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6.66		57½	4	.....33½	21
7 & 8.65		55½	4½ to 8.32½		20
9 & 10.64½		55	9 to 12..28½		15
11 & 12.63½		54			

Butt weld, extra strong, plain ends

⅛	.....54½	41½	⅛ & ¼	.+10	+43
½ to ⅜	.56½	45½	½	25	9
½	.....61½	37½	¾	31	15
¾	.....65½	57½	1 to 2	...38	22½
1 to 3	...67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	.....33½	18½
2½ & 3	..63	55½	2½ to 4.39½		25⅛
3½ to 6.66½		59	4½ to 6.37½		24
7 & 8.65½		56	7 & 8..38½		24½
9 & 10.64½		55	9 to 12..32		20½
11 & 12.63½		54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d.....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d...13 B.W.G.	13.42	11.64	11.06
2 in. o.d.....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2½ in. o.d...12 B.W.G.	18.45	16.01	15.16
2⅝ in. o.d...12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d...12 B.W.G.	21.42	18.59	17.54
3 in. o.d.....12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d.....10 B.W.G.	35.20	30.54	28.66
4½ in o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d..... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d..... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. & 6 in. and smaller....	68½
Larger and longer up to 1 in..	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3 and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive.....	64
1⅛ in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items, there is an additional 5 per cent allowance for carload shipments.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts		
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger.....	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 12½
Stove bolts in bulk	84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

Base Per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham ....65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller.....	50 and 10
Milled headless set screws, cut thread ¾ in. and smaller	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	67½
Upset set screws, cup and oval points	75
Milled studs	60

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.80c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel.....	0.15
6100 Chromium-vanadium bar..	1.20
6100 Chromium-vanadium spring steel	0.35
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes..	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip ...	23.50c.	21.50c.
Cold-rolled strip ...	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot Strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d.
Steel bars, open hearth..	£10 8s.
Beams, open-hearth ...	£10
Channels, open hearth ..	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G...	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm..	£5 13s.
Sheets ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	24.50 base
Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50% $30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of maganese over 2%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$83.00
2.50% carbon	88.00
2% carbon	93.00
1% carbon	103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	29c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	28c.
Man., Brazilian, 46 to 48%	27c

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$19.25
Tungsten, domestic, scheelite delivered	$16.00 to $18.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	22.50
Turkish, 48-49%	22.50
Turkish, 45-46%	19.00
Turkish, 40-44%	17.00
Chrome concentrates (Turkish) c.i.f Atlantic Seaboard, per gross ton: 50%	$25.00
48-49%	23.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	18.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal

No. 2, f.o.b. Bayonne	3.75c.
No. 6, f.o.b. Bayonne	2.26c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.50c.
No. 4 industrial, del'd Cleve'd.	5.25c.
No. 5 industrial, del'd Cleve'd.	3.00c.
No. 6 industrial, del'd Cleve'd.	2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Furnace, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by - product, Chicago ovens	10.25
Foundry, by - product, del'd New England	12.50
Foundry, by - product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by - product, Philadelphia	10.95
Foundry, by - product, delivered Cleveland	10.30
Foundry, by - product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by - product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
•••Plates	3.55c.
•••Shapes	3.55c.
•••Soft steel bars and small shapes	3.60c.
•••Reinforcing steel bars	2.70c.
stock	3.70c.
Cold finished bars and screw stock	3.70c.
•••Hot rolled strip	3.75c.
•••Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
** On reinforcing bars base applies to orders of less than one ton and includes switching and cartage charge.
* All above prices for delivery within the Pittsburgh switching district.
*** For the time being, these prices are purely nominal as concessions ranging from $3 to $5 a ton on these products have been made recently on local sales.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.76c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. charcoal	7.50 to 8.25c.
Cold-fin, shafting and screw stock:	
Rounds, squares, hexagons	4.14c.
Flats up to 12 in. wide	4.14c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
*Hot-rolled sheets (8-30 ga.)	3.40c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, ⅛ in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$2.90

*For lots less than 2000 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	3.80c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over).	3.80c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold-finished strip	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115)	6.85c.

* For 5000 lb. or less.
† 500 lb. base quantity.
Prices shown on hot rolled bars, strip, sheets, shape sand plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.72c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.87c.
Cold fin. rounds, shafting, screw stock	4.07c.
Galv. sheets (24 ga.)	4.53c.
Hot rolled sheets	3.53c.
Galv. corrugated sheets, 24 ga. and heavier*	4.58c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	5.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	3.80
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.35c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.30
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb
*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.11c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.43c.
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.
*For quantities between 400 and 1999 lb.
†For 10 bundles or over.
‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.45c.
Hot rolled sheets No. 10 ga.	3.40c.
Galvanized sheets No. 24 ga. or more	4.75c.
Strip	3.65c.
Reinforcing bars	3.50c.
Floor plates	5.83c.
Cold finished bars	4.73c.
Machine and carriage bolts	.50 & 10 off list
Rivets (structural)	$4.60 base

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

	Base per Lb		
	San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	3.60c.	4.00c.	3.40c.
Shapes, standard	3.60c.	4.00c.	3.40c.
Soft steel bars	3.65c.	4.00c.	3.65c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.275c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.60c.	4.20c.	3.95c.
Galv. sheets (No. 24 and lighter)	5.15c.	4.75c.	4.75c.
Galv. sheets (No. 22 and heavier)	5.40c.	4.75c.	4.75c.
Cold-finished steel Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	$3.00	$2.85	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.43c.
Structural shapes	3.30c.
Plates	3.75c.
Floor plates	5.42c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.58c.
Cold-rolled sheets	4.65c.
Galvanized sheets	4.74c.
Hot-rolled strip, under No. 12	3.33c.
Hot-rolled strip, No. 12 and over	3.58c.
Cold-finished bars	3.85c.
Cold-rolled strip	3.55c.
Hot-rolled alloy steel (SAE 3100 Series)	6.17c.

Quantity extras apply to all items.

. . . NON-FERROUS . . .

. . . Copper dropped again to 10c., Valley . . . Spelter buying in better volume . . . Call for lead continues unabated.

NEW YORK, May 9.—In an unexpected move on Monday, a large copper producer announced a reduction in electrolytic prices to 10c. per lb., Valley delivery, after a 10-day stay at the 10.25c. level. Other sellers, except the Phelps Dodge Corp. which withdrew from the market on April 26, immediately followed suit. Fabricators revised their prices on copper products and brass and bronze alloy makers marked their quotations down to conform with the ¼c. decline in the major market. Asked prices in the open market, which previously had been rather firm at 10.10c., Valley, immediately receded to 10c., with 9.90 to 9.95c. being bid. Domestic sales of the red metal in the past week, while the price was 10.25c., were fairly good, in comparison to recent experience, with about 10,000 tons changing hands. The price reduction, however, immediately dried up buying interest and there was very little activity in the market this morning. Sales abroad this morning brought around 10.05c. per lb., c.i.f., usual base ports, as compared with 10.10c. a week ago.

Lead

The call for lead in the past week, coming from practically every consuming source, was in good volume, with sales well up to the previous week's level. In most cases, sellers found that sales equaled intake. It is estimated that consumers have now covered about 75 per cent of their May requirements and 25 per cent of June needs. The domestic price remains unchanged at 4.75c. per lb., New York, with the London market continuing to be the chief hindrance to higher prices here. Quotations abroad showed little change during the week. This morning's sales in London, all futures, were done at 3c. per lb.

Zinc

After a long period of dullness, the buying movement which began two weeks ago was extended into the past week with the result that close to three weeks' consumption has been sold in 12 days. The past week's purchases, amounting to 7640 tons of all grades, were 2550 tons higher than in the preceding period and 6440 tons above three weeks ago. Most of the current interest is centered on May and June spelter, with positions beyond July receiving very little call. Shipments for the past week were 4148 tons, practically unchanged from the preceding period. Prices here are unchangd at 4.89c. per lb., while the London price continues to move erratically just below the £14 level.

Tin

Apparently consumers bought all the tin they will require for the next several months in the buying flurry of the last half of April and at present are content to sit back and await developments. The past week's dullness was punctuated only by occasional small fill-in lots. Available spot supplies are still closely held and are being rapidly shipped to consumers, leaving the premium on prompt deliveries unchanged at about 30 points. Despite the inactive market, prices were unusually steady all week at 49.25c. per lb., New York, on prompt Straits. The only deviation from that level was on Monday, the day copper prices were cut, when quotations dipped briefly to 49.10c. Cash standards were priced at £224 10s on first call in London today.

NON-FERROUS PRICES

Cents per lb. for early delivery

	May 3	May 4	May 5	May 6	May 8	May 9
Copper, Electrolytic[1]	10.25	10.25	10.25	10.25	10.00	10.00
Copper, Lake	10.25	10.25	10.25	10.25	10.00	10.00
Tin, Straits, New York	49.25	49.25	49.25	....	49.10	49.25
Zinc, East St. Louis[2]	4.50	4.50	4.50	4.50	4.50	4.50
Lead, St. Louis[3]	4.60	4.60	4.60	4.60	4.60	4.60

[1] Delivered Conn. Valley, deduct ¼c. from New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	50.25c.	52.25c.
Copper, Lake	11.50c.	11.125c.
Copper, electro	11.375c.	11.125c.
Copper, Castings	11.00c.	10.875c.
*Copper sheets, hot-rolled	18.12c.	18.12c.
*High brass sheets	16.48c.	16.48c.
*Seamless brass tubes	19.23c.	19.23c.
*Seamless copper tubes	18.62c.	18.62c.
*Brass rods	11.85c.	11.85c.
Zinc slabs	6.15c.	6.90c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.75c.	5.60c.
Lead, bar	6.35c.	8.25c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	29.60c.	29.75c.
Babbitt metal, commercial grade	21.50c.	21.75c.

*** These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.**

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.00c.	9.75c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.25c.	6.50c.
Brass, heavy	4.125c.	4.625c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.25c.	7.75c.
No. 1 yel. brass turnings	4.00c.	4.50c.
No. 1 red brass or compos. turnings	6.00c.	6.625c.
Lead, heavy	3.625c.	4.50c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	12.25c.	13.75c.
Zinc	2.125c.	3.375c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 11.50c. a lb. QUICKSILVER, $94 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.25c. a lb.

. . . GREAT BRITAIN . . .

. . . *New high steel output expected in England this month.*

LONDON, May 9 (*By Cable*)—April steel output figures for Great Britain are expected to show a new high record. It has been officially stated that the high rate expected will be maintained 12 months further now that the Government has extended the country's international obligations.

Commercial demand is improving with large tonnages of ship steel specifications released. Since March 28, 143 vessels amounting to 680,000 tons have been placed.

Sheet works are likely to operate at full capacity for many months following a further release of steel shelter orders. Each shelter weighs approximately 850 lb., of which 650 lb. is sheets.

There is intense activity in tin plate. Unfilled orders are now over 5,000,000 base boxes and the maximum production quota is again raised to 75 per cent for two months beginning May 1. Both home and export consumers are rushing to place orders, especially for prompt delivery. Home buying extends into the first quarter. Prices are firm. There have been unconfirmed reports that Australia will erect a £4,000,000 tin plate plant at Whyalla if the Government will authorize.

Continental steel activity is increasing, with more orders and larger tonnages. Holland, Sweden, the Far East, South Africa and South America are taking good quantities. Poland is planning to increase steel output this year to 700,000 metric tons. Poland has booked 25,000 tons of rails for Iran, delivery to be made in five parts commencing next week.

Questionnaire on Basing Points Brings More Replies

ADDITIONAL replies which have been received by THE IRON AGE in answer to questions submitted to consumers and distributers of steel on the basing point system confirm the results of the earlier returns published in THE IRON AGE of April 20, pages 46-47.

Since the publication of that report, 17 additional replies have been received. The answers are as follows:

Question No. 1. Do you feel that your ability to buy steel from a number of different sources at no difference in the delivered cost to you is an advantage in the economical operation of your business? Yes, 13; No, 1.

Question No. 2. Do you agree with the Federal Trade Commission that the abolition of freight rate equalization on steel shipments would be a good thing for the steel consuming industry? Yes, 4; No, 12.

Some who replied did not check both questions, which accounts for the differences in the totals.

A recapitulation of the total replies received thus far shows that 321 answers were received by THE IRON AGE, of which 281, or about 92.4 per cent, voted Yes on Question No. 1 and 23, or 7.6 per cent, voted No. On Question No. 2, 41, or about 13.6 per cent, voted Yes and 245, or 86.4 per cent, voted No.

. . . CANADA . . .

. . . *Foreign orders helping mills in Dominion.*

TORONTO, May 9.—Export demand for steel is responsible for upswing in operations in the Canadian steel industry and has resulted recently in capacity operations for the Dominion Steel & Coal Corp. plant at Sydney, N. S., as well as for increased activities at the company's iron mines at Wabana, Newfoundland. The iron mines are on a production basis of 1,600,000 tons annually, of which about 1,000,000 tons is for export to European countries, chiefly Germany and Great Britain. Steel Co. of Canada, Ltd., Hamilton, Ont., recently has booked orders for steel from Britain and is stepping up production. A number of other Canadian companies also are in receipt of large contracts for war materials from Britain and other large contracts are pending.

Demand for iron and steel for peace-time production operations continues somewhat spotty. The automotive industry has increased purchases recently. Demand for materials by the implement makers, radiator companies and sanitary ware concerns, however, is almost at a standstill and few orders are reported from these quarters. Jobbers report steady demand for bars and sheets with favorable call for small lots of structural steel. Prices generally remain steady and unchanged.

Pig iron melters are not placing large tonnage contracts for spot or future delivery and most sales are in lots around 100 tons. Smaller users are furnishing most of the new business with the majority of the large melters carrying stocks for current needs. Production of pig iron continues limited to the minimum rate for the year.

Briggs & Stratton Sole Graham Unit Licensee

BRIGGS & STRATTON CORP., Milwaukee, has become exclusive licensee for manufacture and sale of the Graham unit—now to be called the Briggs & Stratton variable speed transmission. The company is now in quantity production on several sizes.

Several new sizes are being added. The complete line will cover units from ⅛ to 10 hp., as well as a complete line of controls, including manual, remote mechanical, remote electrical, automatic, etc. These are described in a new Bulletin TP-401 just released by Briggs & Stratton. This transmission—as previously announced in these columns—gives speeds in infinite steps from maximum to zero and reverse, is self-contained, runs in oil, is all metal in construction, permits changes in speed both running and stationary, and develops full torque over the entire range of speed down to zero.

Porcelain Enamel Institute Forum at Columbus, Oct. 18-20

THE fourth annual forum of the Porcelain Enamel Institute will be held at Ohio State University, Columbus, Ohio, Oct. 18 to 20.

FABRICATED STEEL

. . . Lettings advance to 28,650 tons from 11,950 tons last week . . . New projects decline to 12,750 tons . . . Plate awards only 310 tons.

NORTH ATLANTIC STATES
AWARDS

14,000 Tons, Havre de Grace, Md., superstructure, Susquehanna River bridge, to Bethlehem Steel Co., Bethlehem, Pa.

4000 Tons, State of New York, tunnel liners, structural shapes, etc., Delaware Aqueduct contract 319, to Carnegie-Illinois Steel Corp., Pittsburgh, through Dravo Corp., Pittsburgh, contractor.

2250 Tons, Philadelphia, J. J. Greenberg apartment building, to Fort Pitt Bridge Works Co., Pittsburgh.

825 Tons, Washington, buildings Nos. 1 and 2, Social Security and Railroad Retirement, to Bethlehem Steel Co., Bethlehem, Pa.

500 Tons, Queens, N. Y., Cross Island Parkway grade separation, 39th-46th Avenue, to Harris Structural Steel Co., Plainfield, N. J.

440 Tons, New York, D. Milliken Co., building, Leonard and Church Streets, to American Bridge Co., Pittsburgh.

400 Tons, Washington, Gallinger Hospital, ward building No. 2, to Fort Pitt Bridge Works Co., Pittsburgh.

370 Tons, Brooklyn, theater and store buildings, Red Hook, to Ingalls Iron Works Co., Birmingham.

350 Tons, Clyde, N. Y., school, to Bethlehem Steel Co., Buffalo.

300 Tons, Boston, Albany Street bridge repairs, to American Bridge Co., Pittsburgh.

250 Tons, Almond, N. Y., school, to American Bridge Co., Pittsburgh.

235 Tons, Northampton, Mass., school, to Haarmann Steel Co., Holyoke, Mass., through M. J. Walsh & Sons, Holyoke, contractors.

200 Tons, Beltsville, Md., service building and distribution system for Department of Agriculture, to Belmont Iron Works, Philadelphia.

195 Tons, New York, two-story building, 60th Street and Broadway, to Dreier Structural Steel Co., New York.

160 Tons, Dover, Vt., State highway bridges, to Bethlehem Steel Co., Bethlehem, Pa.

130 Tons, Long Island City, N. Y., garage for International Harvester Co., to Belmont Iron Works, Philadelphia.

115 Tons, Genoa, N. Y., high school building, to American Bridge Co., Pittsburgh.

THE SOUTH

355 Tons, Richmond, Va., U. S. Tobacco Co., to Virginia Bridge Co., Roanoke, Va.

235 Tons, Perry, Ark., bridge, to Clinton Bridge Co., Clinton, Iowa, through S. M. Dixon, contractor.

220 Tons, Charlottesville, Va., high school, to Richmond Structural Steel Co., Richmond, Va., through John Felmley, Bloomington, Ill., contractor.

180 Tons, Lawrenceburg, Ky., Seagram plant, to International Steel & Iron Co., Evansville, Ind.

145 Tons, Front Royal, Va., high school, to Belmont Iron Works, Philadelphia.

CENTRAL STATES

760 Tons, Mishawaka, Ind., extension to power plant for Indiana & Michigan Electric Co., to Edwards Iron Works, South Bend, Ind.

400 Tons, Cleveland, sewer, to R. C. Mahon, Detroit.

390 Tons, Bloomington, Ill., bridge section, to Mississippi Valley Structural Steel Co., St. Louis.

230 Tons, Winnebago County, Wis., bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

210 Tons, Mundelein, Ill., bridge section, to A. F. Anderson Iron Works, Chicago.

175 Tons, Rock Falls, Ill., State bridge, to Fort Pitt Bridge Works Co.

150 Tons, Comstock, Mich., State bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

135 Tons, Kenosha, Wis., sewage plant, to Chicago Bridge & Iron Co., Chicago.

135 Tons, West Allis, Wis., horse barn, to Milwaukee Bridge Co., Milwaukee.

125 Tons, St. Paul, Minn., beam spans for Great Northern Railroad, to American Bridge Co., Pittsburgh.

110 Tons, Gays Mills, Wis., bridge, to Midland Structural Steel Co., Cicero, Ill.

WESTERN STATES

210 Tons, Los Angeles, Ryan Aviation Co., factory building, to National Iron Works, San Diego, Cal.

160 Tons, Mare Island Navy Yard, crane, to Fort Pitt Bridge Works Co., Massillon, Ohio, through R. W. Kaltenbach Corp., Bedford, Ohio.

150 Tons, Hood River, Ore., bridge repair, to Columbia Steel Co., San Francisco.

130 Tons, Littleton and Denver, Colo., State bridges, to American Bridge Co., Pittsburgh.

125 Tons, Oakland, Cal., gold dredge superstructure, to Moore Dry Dock Co., Oakland.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

3200 Tons, New York, William Howard Taft High School in Bronx, bids May 22.

2500 Tons, Buffalo, municipal auditorium; F. W. Hendrich Co., Inc., Buffalo, low bidder (previously reported).

700 Tons, New York, section of East River Drive; bids close May 19.

500 Tons, Parlin, N. J., additions to process and recovery buildings for Hercules Powder Co.

450 Tons, Pittsburgh Mission Street bridge.

325 Tons, Philadelphia, pickling plant crane runway wharf E, for Navy Department.

300 Tons, Elizabeth, N. J., apartment houses for Elizabeth Housing Authority.

300 Tons, New York, freight terminal, New York Central Railroad, James Stewart & Co., New York, general contractor (previously reported).

265 Tons, Northeast, Md., State bridges.

230 Tons, New York, grade separation, Shore Parkway.

THE SOUTH

115 Tons, Ways Ga., renewal, Ogeechee River bridge for Seaboard Air Line Railway.

CENTRAL STATES

1200 Tons, Holland, Mich., generating plant.

425 Tons, Oakford, Ill., Federal flood control project, bridge relocation; bids June 1.

300 Tons, Center Grove, Iowa, State bridge.

300 Tons, Columbus, Ohio, laboratory building for Battelle Memorial Institute.

250 Tons, Stevens Point Wis., State grade separation.

200 Tons, Hutsonville, Ill., power house, Central Illinois Public Service Co.; bids May 17.

200 Tons, Youngstown, Rayen High School addition.

115 Tons, St. Paul, Minn., fruit house.

WESTERN STATES

1508 Tons, Seattle, Ballard Bridge approach; Acme Construction Co., West Coast Construction Co., and Macri Bros., Seattle, joint low bidders (Alternate B). Previously reported.

629 Tons, Los Angeles, Dayton Avenue Bridge; bids open May 16.

475 Tons, San Francisco, American Smelting & Refining Co. plant (revised tonnage).

229 Tons, Aurora, Colo., five bridges and one culvert on State Highway No. 8; bids May 11.

FABRICATED PLATES
AWARDS

310 Tons, Cincinnati, eight tanks for Standard Oil Co., to Chicago Bridge & Iron Co., Chicago.

SHEET PILING
AWARDS

1400 Tons, New York, East River drive, to Carnegie-Illinois Steel Corp., Pittsburgh.

1250 Tons, Cleveland, Cuyahoga River straightening, cut No. 6, contract No. 7, to Carnegie-Illinois Steel Corp., through Great Lakes Dredge & Dock Co., Cleveland.

125 Tons, Buffalo, W. T. Grant store, to Bethlehem Steel Co., Buffalo.

PENDING PROJECTS

900 Tons, Cleveland, Cuyahoga River straightening, cuts Nos. 7 and 8; bids May 11.

267 Tons, Los Angeles, United States Engineer (Proposal 217); bids in.

W. K. Bailey Sales Manager For Warner & Swasey

CLEVELAND—Walter K. Bailey, assistant sales manager of the Warner & Swasey Co., Cleveland, has been made sales manager of the company. Mr. Bailey entered the Warner & Swasey Co. as a special apprentice immediately after his graduation from Oberlin College in 1919. In 1920 he left the company to go into the retail store field, and in 1921 went to Oberlin College as instructor of physical education and assistant football coach. He returned to Warner & Swasey in 1922 as a salesman in the Chicago territory.

In 1924 Mr. Bailey was made sales manager of the Cleveland district and in 1936 he became service manager, spending most of his time in developing a new line of standard tools for the company. He became assistant sales manager in 1938.

As executive in direct charge of sales, Mr. Bailey assumes the responsibilities formerly held by Clifford S. Stilwell, who recently became executive vice-president of the company.

Imports at Philadelphia

PHILADELPHIA—The following iron and steel imports were received here during the past week: 998 tons of pig iron from India; 150 tons of ferromanganese from Poland; 33 tons of wire rods, 41 tons of steel tubes and 9 tons steel bars from Sweden; 29 tons of steel bars, 2 tons of steel bands, and 48 tons of structural shapes from Belgium.

Consolidation of Speeder Machinery Corp., Cedar Rapids, Iowa, manufacturer of ⅝-yd. to ¾-yd. power operated excavating and materials handling shovels, draglines, cranes, and the shovel division of Link-Belt Co., has been announced by Alfred Kauffmann, president of Link-Belt Co., Chicago. Speeder Machinery Corp. will be operated as a subsidiary of Link-Belt Co. with the present management continuing to operate the business. T. M. Deal will continue as president.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

. . . Foreign orders and inquiries show pick-up, some equipment being for munitions manufacture . . . Domestic bookings slightly off . . . Railroads show more interest.

Slight Gain in Foreign Sales Offset Domestic Losses

CINCINNATI — Machinery demand in this area showed no important change in the past week. Foreign demand was up a shade which absorbed a slight easing in domestic ordering. The market is optimistic on the basis of the steady inquiry from widely scattered sources, but domestic political and foreign affairs still disturb feelings of manufacturers. Both Near East and European buyers were in the market for multiple unit orders of grinders and lathes. The bulk of this business was for heavier types of these tools. Local buying tended toward smaller lathes, grinders and milling machines. Buyers were widely scattered and represented varying commercial uses.

Plant operations are unchanged at about 60 per cent of capacity.

Munitions Making Machinery Features Foreign Inquiry

CLEVELAND—Producers are receiving attractive inquiries from abroad for shell making equipment, particularly from England. The domestic picture for the next few weeks is difficult to appraise, however. Recent bookings from Chicago and the East have been fair, but in this immediate district the first week of May has proved less eventful than the close of April. Deliveries on certain types of machine tools are not prompt by any means. Press manufacturers report automotive orders are coming through and more are in the offing. Activity in war supplies is expected to gain momentum this month for press makers.

Railroads in Middle West Show More Interest in Tools

CHICAGO—Although machine tool orders so far in May have been few, most sellers are still optimistic for prospects later in the year and some are even anticipating a fairly good May. One large sales agency during April increased both its number of units sold and the number of customers sold. In addition, this business was spread over the agency's entire Midwestern territory and represented a healthy interest rather than a concentration of buying from one or two specific industries. The Santa Fe is understood to have placed some business lately and it is believed that the Milwaukee Road will take action on a list which has been pending for some time. The Illinois Central is inquiring for about a dozen machine tools for its shops at Paducah, Ky., bids being asked for May 15. Orders have been received in the past week or so from the Rock Island Arsenal, International Harvester Co., Electro-Motive Corp. and the die and mold industry.

Bulk of Eastern Sales Still to Government Sources

NEW YORK—Buying by arsenals has been an important factor in recent machinery buying and in the past month a small arms plant placed orders for considerable productive equipment, largely on the basis of the best deliveries. Aircraft engine and accessories plants also continue to occupy the limelight, and while current sales are far from disappointing, most sellers would like to see a better diversification of orders. To some there has been a distinct dropping off in sales to firms in general industrial lines who are not making commitments because of Government contracts. Machine tool builders are so well occupied in filling orders from these latter sources and from abroad and in the Orient that on certain classes of machine tools, notably lathes, deliveries are beginning to lengthen. From an off-the-shelf basis of a few months back, the position has changed to a minimum of six weeks in some instances. The small arms factory mentioned above proved in its purchases that considerable shopping around had to be done to get prompt delivery on all items needed.

Chevrolet to Buy Broaching Machines for Flint Plant

DETROIT—Part of the very modern machine facilities installed a year or so ago in the Chevrolet Tonawanda plant will be duplicated at Flint shortly, it is understood. The Tonawanda plant was tooled for 1200 axles and engines a day. One of the initial steps, it is understood, will be the installation of broaching equipment for the tops and bottoms of cylinder blocks. At present the Flint plant grinds the tops and bottoms of blocks.

Britain Importing Larger Quantities of Steel

LONDON—United Kingdom's steel imports are substantially increasing as the domestic industry continues to work at the new peak level of production indicated in the March output figures. These steel imports are ancillary rather than competitive to the domestic industry and the increasing demand goes to satisfy the expanding needs of various manufacturers in South Wales and Central England, who are largely dependent on semi-finished imported material.

There can be little doubt that for some months to come British steel production will continue to approach capacity—about 1,200,000 tons per month.

It is worth noting that, to supplement steel supplies for the defense program, Britain has placed orders for the first time with the Broken Hill Proprietary Co., Australia, for substantial quantities of semi-finished products. Deliveries should commence in Britain about the end of June.

It is expected that this Australian material will help to ward off a shortage threatened by the difficulty of obtaining adequate supplies of scrap. The shipbuilding orders consequent upon the Government's subsidy proposals are likely to increase the strain upon Britain's steel making capacity.

SWOC Wins Election In Pittsburgh Plant

PITTSBURGH—The Steel Workers Organizing Committee recently won an election at the Hubbard & Co. plant here by a vote of 364 to 168. This latest election culminates a series of negotiations between the company and the union.

A. F. A. and Dust Control Group to Pool Ideas

CLEVELAND — Interchange of ideas has been arranged for between the members of the Dust Control Equipment Association and the chairman of the Industrial Hygiene Codes Committee of the American Foundrymen's Association. James R. Allan, chairman of the committee, was present at a recent meeting here and described the progress being made by his group in completing certain industrial codes.

Recently the dust control equipment manufacturers decided that considerable improvement in performance of equipment in connection with which there is dust hazard could be brought to the ultimate user by making available to manufacturers of such equipment the advice and assistance of the engineering committee of the Association in dealing with problems encountered by such manufacturers.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Shell Union Oil Corp., 50 West Fiftieth Street, New York, has acquired 36-acre tract in Drewrys Bluff district, about five miles from Richmond, Va., for new bulk river-rail storage and distributing plant. It will include dock for tankers, loading racks for tank trucks, pumping station and other structures, with six spheroid type pressure tanks with gross capacity of 4,000,000 gal. Cost over $80,000 with equipment.

Best Foods, Inc., 88 Lexington Avenue, New York, canner and packer, plans new three-story plant at Eighteenth and Bryant Streets, San Francisco. Cost close to $100,000 with equipment. Kaj Theill, 580 Market Street, San Francisco, is engineer. General offices of company in latter city are at 1900 Bryant Street.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until May 16 for 100 armature assemblies (Circular 240); until May 24, 555,000 ft. of one-conductor submarine mine cable (Circular 229).

Duke Laboratories, 46-10 Eleventh Street, Long Island City, drug and chemical products, has leased new one-story building at 375 Fairfield Avenue, Stamford, Conn., totaling 30,000 sq. ft. of floor space for plant.

General Atlas Carbon Co., 60 Wall Street, New York, plans new carbon black plant at Guymon, Okla., where site has been secured, to include compressor station, pipe lines, etc. Cost about $75,000 with equipment. F. M. Perry, Pampa, Tex., is company engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 16 for 296 oxy-acetylene welding torches and 300 oxy-acetylene cutting torches (Schedule 6421) for Brooklyn Navy Yard; electric sirens (Schedule 6166) for Brooklyn and Philadelphia yards; until May 23, Swiss-pattern needle files (Schedule 6235) for Brooklyn, Sewall's Point and Mare Island yards.

Quartermaster, West Point, N. Y., asks bids until May 16 for one condensing unit (Circular 1052-144).

Continental Oil Co., 60 East Forty-second Street, New York, has let contract to Fluor Corp., Ltd., 101 West Eleventh Street, Kansas City, Mo., for new natural gasoline plant in Ville Platte, La., oil field area, with main refining unit to be used for processing. Plant will include compressor station, pumping plant, steel tank storage facilities and other structures. Cost about $500,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until May 25 for gages (Circular 214).

Heyman Mfg. Co., 2127 Stanley Terrace, Unionville (Union Township), N .J., manufacturer of metal stampings, etc., has acquired about three acres at Kenilworth, N. J., for new one-story plant. Cost close to $45,000 with equipment. Present works will be removed to new location and capacity increased.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until May 16 for honing tool for dies (Circular 1070); until May 17, motor-driven centrifugal pump for low-pressure water hydraulic system (Circular 769); until May 31, motor-driven drilling machine (Circular 770).

Molded Insulation Co., Inc., 3246 Ludlow Street, Philadelphia, manufacturer of insulation plastic products, has purchased two-story building, on site 160 x 174 ft., at 335-51 East Price Street, and will improve for plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 16 for two motor-driven power hacksaws (Schedule 6239).

Peerless Printing Ink Co., 1306 Melon Street, Philadelphia, manufacturer of inks and allied products, has leased two-story and basement building at Ontario and Janney Streets, for plant.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until May 16 for one motor-driven lathe (Circular 1102), 12 steel trucks for cal. 0.50 lead slugs (Circular 1093), one circuit breaker-type lighting panel board and cabinet (Circular 1090); until May 17, one arbor press (Circular 1104).

BUFFALO DISTRICT

Carborundum Co., Niagara Falls, N. Y., grinding wheels and other abrasive products, etc., plans one-story addition, 60 x 110 ft. Cost close to $50,000 with equipment.

Board of Education, High School Building, Lockport, N. Y., George M. Southard, president, asks bids until May 15 for shop equipment (Contract 13), printing shop equipment (Contract 12), metal lockers, tool cabinets, shelving, etc. (Contract 11), shop benches, mechanical drawing room equipment, wall cabinets, etc. (Contract 8) for addition to Emmet Belknap School and Hawley School. Carl Schmill & Son, Prudential Building, Buffalo, and J. Markley Tully, Bewley Building, Lockport, are associated architects.

Spencer Kellogg & Sons, Niagara Square, Buffalo, linseed and other oils, have let general contract to James Stewart Corp., 343 South Dearborn Street, Chicago, for one-story soy bean processing mill at Decatur, Ill. Cost over $100,000 with machinery. McKenzie-Hague Co., Corn Exchange Building, Minneapolis, is engineer.

SOUTH ATLANTIC

Georgia Power Co., Atlanta, Ga., has asked bids on general contract for one-story equipment storage and distributing building, and will begin erection this month. Cost about $40,000 with mechanical-handling and other equipment.

Schaaf Preserving Co., 1305 N. W. Twenty-second Street, Miami, Fla., has asked bids on general contract for one-story addition to fruit processing and packing plant. Cost close to $45,000 with equipment.

Marion Coca-Cola Bottling Co., Marion, S. C., has let general contract to Haynesworth Construction Co., Inc., Florence, S. C., for one-story mechanical-bottling plant. Cost about $45,000 with equipment. Hopkins & Baker, Florence, are architects.

NEW ENGLAND

Bureau of Yards and Docks, Navy Department, Washington, asks bids until May 17 for combustion control equipment for power house at Boston Navy Yard (Specifications 9120).

Draper Corp., Hopedale, Mass., textile mill machinery and parts, has let general contract to Bathelt Construction Co., 6 Newton Street, Holyoke, Mass., for one-story addition. Cost about $50,000 with equipment. McClintock & Craig, 458 Bridge Street, Springfield, Mass., are architects.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until May 15 for two speed lathes (Circular 434); until May 16, 2200 strap hinge assemblies and 1100 latch group assemblies (Circular 429).

Chandler-Evans Corp., 2200 Eighth Street, Detroit, manufacturer of carburetors, fuel pumps, etc., for aircraft motors and diesel engines, parts, etc., has let general contract to Austin Co., Cleveland, for one-story branch plant, 100 x 143 ft., on about five-acre tract near Martin airport, Meriden, Conn., recently acquired. Cost close to $75,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 26 for 132 low-pitch electric sirens (Schedule 6265) for Portsmouth, N. H., and Mare Island Navy yards.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 26 for small tools, dies, wrenches, vises, gear pullers, wheel pullers, lathe tool holders, jacks, arbors, bars, benders, drills, grinders, twist gages, files, reamers, threading sets, screw-drivers, pliers, oil pumps and other equipment (Circular 398-108).

L. S. Briggs, Inc., Eleventh and E Streets, S. W., Washington, meat packer, has asked bids on general contract on revised plans for one-story addition. Cost close to $50,000 with equipment. J. R. Worcester & Co., 79 Milk Street, Boston, are consulting engineers.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two-story addition to building at local Navy Yard (Specifications 9104).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until May 18 for 76 chemical containers, each one-ton capacity, steel shell (Circular 381).

General Purchasing Officer, Panama Canal, Washington, asks bids until May 15 for 20,000 ft. of copper cable for power transmission (Schedule 3460); until May 17, one electric stamping press, belt-driven planer, wood-boring drill, mine sampling and hitch cutting tools, cast iron pipe bends, etc. (Schedule 3456).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 16 for two motor-driven precision vertical milling machines (Schedule 6240) for Alexandria, Va.; 43,000 ft. of heat and flame-resistant electric cable (Schedule 6246), saws, including band, back, compass, cross-cut, keyhole, etc. (Schedule 6180); until May 23, drill chucks (Schedule 6204), nippers and pliers (Schedule 6186), galvanized conduit pipe (Schedule 6194), tinner's shears (Schedule 6195), wrenches (Schedule 6187) for Eastern and Western Navy yards.

SOUTHWEST

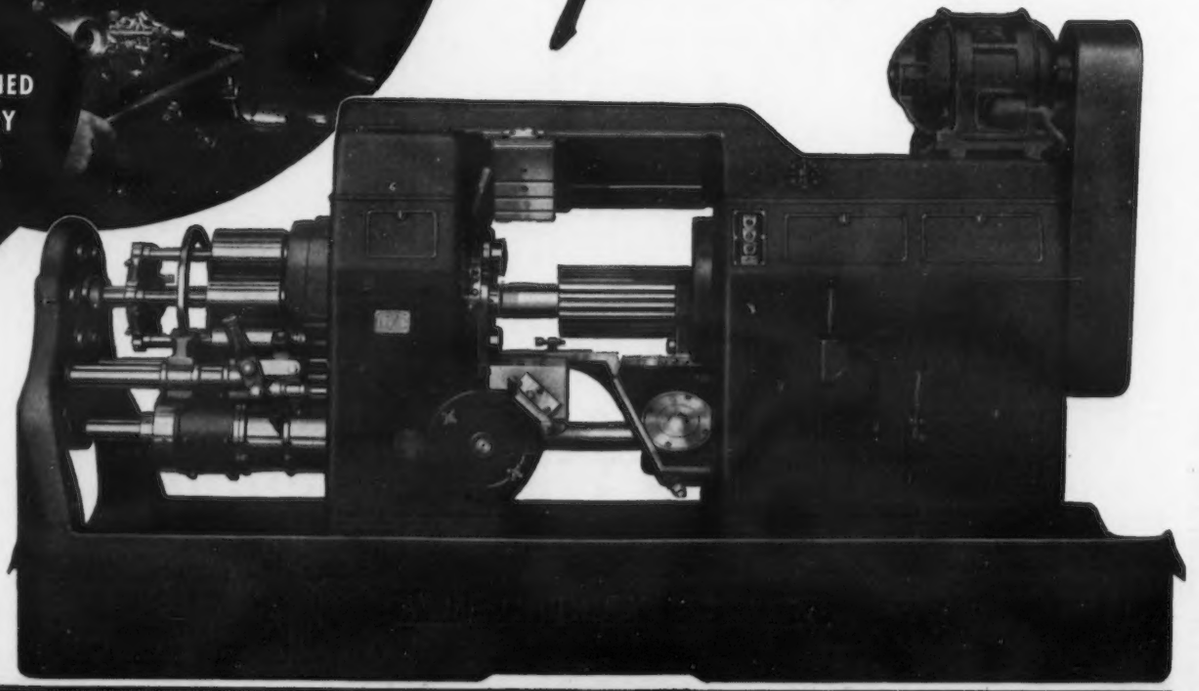
State Building Commission, Edgar M. Eagan, executive secretary, Bi-Partisan Advisory Board, Merchants Bank Building, Jefferson City, Mo., will take bids this month for extensions and improvements in power plant at local State prison, including additional equipment; cost about $100,000. Bids will be taken at same time for new power house at local State auxiliary prison, with diesel engine-generator units and accessories; cost about $50,000. Baumes Engineering Co., Railway Exchange Building, St. Louis, is consulting engineer.

Farmers' Cooperative Commission Co., Hutchinson, Kan., H. C. Morton, general manager, has let general contract to Chalmers & Borton Construction Co., 28 East First Street, for addition to grain elevator, including new tanks with capacity of about 700,000 bu. Cost close to $90,000 with elevating, conveying, screening and other equipment.

Purchasing Officer, Department of Interior, Washington, asks bids until May 16 for two graders, one gasoline engine-driven, tandem drive, and one diesel engine-driven, for Tularosa, N. M. (Circular 4899).

American National Aircraft Corp., Trinity Building, Fort Worth, Tex., John B. Miller, vice-president and general manager, recently organized to take over National Aircraft Co., San Antonio, Tex., has let general contract to W. S. Moss Co., Lubbock, Tex., for new plant on 63-acre tract near San Antonio, lately acquired, consisting of several one-story units for parts production and assembling. Plant

Acme-Gridleys give you TOOL SPACE



EXPERIENCED set-up men and operators say they prefer Acme-Gridley 6-spindle automatics "because they're wide open from both sides"... accessible for quick cam changes... have independent adjustments for all six side slides.

Even when you take advantage of the production gains and finer finishes by using high speed drills, taper-turning, boring, recessing, burnishing and pick-off attachments, you will find no make-shift tooling . . . all tools are still "get-at-able."

This means less time out for tool grinds and adjustments... quicker change over to the next job . . . more PRODUCTIVE hours . . . lower cost per piece.

Ask National Acme production engineers to get you tooling lay-outs, to give you guaranteed speeds and tolerances on your work.

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

will specialize in military aircraft. Cost about $200,000 with equipment. Wyatt C. Hedrick, First National Bank Building, Fort Worth, is architect.

WESTERN PA. DIST.

Du Bois-Martin Aircraft Corp., Du Bois, Pa., now being organized, care of George Garth, Du Bois Business Men's Association, plans local works for production of military aircraft and will take over about 500 acres near airport. Initial works will comprise several one-story units for parts manufacture and assembling. Cost over $200,000 with equipment. Association noted is interested in project and is raising fund of about $20,000 to insure establishment of plant. Capt. R. H. Martin will be president of new company.

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, packer and canner, has asked bids on general contract for new two-story and basement branch plant on Elizabeth Avenue, Newark, N. J. Cost over $85,000 with equipment.

SOUTH CENTRAL

Southern Cotton Oil Co., Canal Bank Building, New Orleans, cottonseed oil products, has acquired about 10-acre tract at Natchitoches, La., for new mill, including power house, machine shop and auxiliary structures. Cost close to $85,000 with machinery. Bids will be asked soon on general contract.

United States Engineer Office, Vicksburg, Miss., asks bids until May 15 for one gasoline engine-driven electric generating set (Circular 216).

F. M. and William Prince, Birmingham, have acquired former plant of Dixie Metal Co., on three-acre tract at Leeds, Ala., and will remodel for production of refrigerating equipment, including refrigerating units for motor truck bodies. One or more one-story additions are planned.

Kerby Milling Co., 141 North First Street, Nashville, Tenn., plans rebuilding part of grain and flour mill recently destroyed by fire. Loss about $125,000 with machinery. Two adjoining mills, Freeland Milling Co., and Royal Flour Co., also were partially destroyed by same fire, with losses estimated at $100,000 and $50,000 respectively, including equipment, and also plan early rebuilding.

OHIO AND INDIANA

B. F. Goodrich Co., Akron, Ohio, automobile tires and tubes, etc., has approved plans for new branch mill at Clarksville, Tenn., consisting of several one and multi-story units, with total floor space of about 200,000 sq. ft., to be given over entirely to production of mechanical rubber goods. Plant will include power house, pumping station, machine shop and other mechanical structures. Cost about $1,500,000 with equipment.

State Welfare Department, State Office Building, Columbus, Ohio, asks bids until May 19 for extensions and improvements in power house at institution at Hawthornden, near Northfield, Ohio, including 400-hp. engine-generator unit and accessories, boilers, stokers and auxiliary equipment. Cost close to $100,000. J. P. Schooley, first noted address, is state architect; R. G. Ingleson, 229 South Front Street, Columbus, is engineer.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until May 15 for self-locking plate nuts (Circular 987), 5600 self-locking padlocks (Circular 996), bomb shackles and test apparatus (Circular 997); until May 16, vapor-tight extension lamp assemblies and guards (Circular 990), solenoid plunger assemblies, plunger springs and plunger sleeve nuts (Circular 994), one arbor press (Circular 1011) plate-graining machine and 500 lb. of steel marbles (Circular 1018), 200 hydraulic jack assemblies, 10,000-lb. capacity (Circular 981); until May 18, exhaust fan (Circular 1012), wobble pump control torque shaft bearings, engine ring cowling brackets, closure strip connecting latch barrels, intensifier tube adjustable supports (Circular 1006).

Allison Engineering Co., Speedway City, Indianapolis, manufacturer of aircraft motors and parts, a division of General Motors Corp., will award general contract soon for one-story additions, totaling about 200,000 sq. ft. of floor space, giving plant a total area of 300,000 sq. ft., for expansion in parts production and assembling divisions. Cost over $2,000,000 with machinery.

MICHIGAN DISTRICT

Grand River Oil Co., Grand Rapids, Mich., recently organized, has taken over assets of Imperial Refining Co., Grand Rapids, and has plans for new oil refinery in Wyoming Township, near city. It will include steel tank storage division, loading racks, pumping station, power house and other structures. Cost close to $125,000 with equipment. Albert H. Hickey, Alma, Mich., is vice-president and general manager.

Quartermaster, Fort Wayne, Mich., asks bids until May 18 for one automatic stoker (Circular 954-26).

Chrysler Motor Parts Corp., Detroit, affiliated with Chrysler Corp., has acquired about 10-acre tract at Oakland, Cal., for new one-story factory branch, storage and distributing plant. Initial unit will total about 50,000 sq. ft. of floor space, with office building adjoining. Cost over $150,000 with equipment. Work will begin soon.

City Council, Holland, Mich., has rejected bids recently received for high-pressure boiler units and auxiliary steam power equipment for municipal electric power plant, and will ask new bids soon. Hamilton & Weeber, Federal Square Building, Grand Rapids, Mich., and Giffels & Vallet, Inc., Marquette Building, Detroit, are consulting engineers.

Court order providing for dissolution of Fox Machine Co., Jackson, Mich., has been signed in Jackson County Circuit Court. Petition for order stated that action was taken in best interests of stockholders. Jackson City Bank & Trust Co. was named temporary receiver.

MIDDLE WEST

Link-Belt Co., 307 North Michigan Avenue, Chicago, has let general contract to Morris-Quillin, Santa Fe Building, Dallas, Tex., for one-story factory branch, storage and distributing plant at Latimer and Pierce Streets, Dallas. Cost over $85,000 with equipment. Local offices of company are at 413 Second Street. Pitzinger-Lane Associates, Inc., Southwest Life Building, Dallas, is architect.

American Filter Products, Inc., 3227 South Shields Avenue, Chicago, filtration equipment, parts, etc., has let general contract to Elston Construction Co., 4846 North Elston Avenue, for two-story addition. Cost close to $40,000 with equipment. R. V. Faro, 104 South Michigan Avenue, is architect.

Joyce 7-Up, Inc., 12 Webster Avenue, Joliet, Ill., has asked bids on general contract for one and two-story and basement mechanical-bottling plant on Plainfield Road, near city. Cost about $200,000 with equipment; also for similar branch plant at Ashland Avenue and Thirty-first Street, Chicago, to cost approximately a like amount. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, Chicago, are architects.

Prichard Oil Co., Des Moines, Iowa, plans new bulk oil storage and distributing plant at Bettendorf, Iowa, including pumping station, 150,000-gal. steel tanks and other operating facilities. Cost about $60,000. J. F. Linebarger will be in charge of construction.

United States Engineer Office, Fort Peck, Mont., asks bids until May 15 for two horizontal, locomotive-type, steam boilers with oil burners and accessories (Circular 313).

Coca-Cola Bottling Co., 2035 University Avenue, Minneapolis, Minn., has let general contract to E. J. DesMarais, Staples, Minn., for two-story and basement mechanical-bottling plant at Fergus Falls, Minn., 66 x 110 ft. Cost about $50,000 with equipment. Ernest Schmidt, Coughlin Building, Mankato, Minn., is architect.

Richard F. Poncher, Chicago, has leased four-story and basement building at 615 West Randolph Street, Chicago, for manufacture of radio equipment and parts.

Everett Chemical Co., 919 East Garfield Avenue, Milwaukee, has purchased former plant of Waltham Piano Co., 3717 North Palmer Street, containing 80,000 sq. ft. floor space and will make alterations and install considerable new equipment. A. C. Krueger is president.

Kimberly-Clark Corp., 128 North Commercial Street, Neenah, Wis., has started work on new boiler house at branch paper mill at Niagara, Wis., 61 x 90 ft., 80 ft. high, to cost $100,000 with equipment. C. W. Nelson is chief engineer.

PACIFIC COAST

Coast Centerless Grinding Co., 761 East Slauson Avenue, Los Angeles, has let general contract to Harry W. Marshall, 633 North Western Avenue, for one-story shop, 50 x 100 ft., at 5720 Paloma Street, for storage and distribution. Cost close to $40,000 with equipment. William D. Coffey, Transamerica Building, is engineer.

Bureau of Reclamation, Denver, asks bids until May 23 for one 13-ton gantry crane for Roza diversion dam, Yakima, Wash., project (Specifications 1229-D); also until May 17 for one 28¼-in. tube valve for tunnel plug at Snow Lake tunnel, Columbia Basin project, Wash. (Specifications 1226-D).

Lloyd A. Fry Roofing Co., 5302 West Sixty-sixth Street, Chicago, roofing products, has let general contract to Dougan-Hammond Construction Co., Rothchild Building, Portland, for one-story plant at N. W. Yeon Avenue and Thirty-fifth Street, Portland, consisting of several units totaling 150 x 550 ft. Cost close to $200,000 with equipment.

Coca-Cola Bottling Co., Seattle, will take bids soon on general contract for one-story mechanical-bottling works to occupy larger part of block bounded by Cherry, Columbia, Thirteenth and Fourteenth Streets. Cost about $225,000 with equipment. Jesse M. Shelton, Atlanta, Ga., is architect; Graham & Painter, Dexter-Horton Building, Seattle, are associate architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 19 for one motor-driven metal cutting saw table (Schedule 6216) for Puget Sound Navy Yard; eight electric arc-welding sets (Schedule 6200) for San Diego yard; one hand tube-bending machine (Schedule 6202); until May 23, 16 portable electric grinders (Schedule 6236) for Mare Island Navy Yard; one motor-driven metal-cutting saw (Schedule 6232); until May 19, six electric chain hoists, with one set of spare parts for motors, controllers and magnetic brakes (Schedule 6219) for San Pedro, Los Angeles, Naval Station.

American Pipe & Steel Co., 230 Date Avenue, Alhambra, Cal., has let general contract to Earle Hugens, 745 East California Street, Pasadena, Cal., for one-story addition. Cost about $40,000 with equipment. Albert C. Martin, Higgins Building, Los Angeles, is architect.

FOREIGN

State Rivers and Water Supply Commission, Melbourne, Victoria, Australia, asks bids until June 21 for two diesel engine-driven tractors on caterpillar traction, one to be 2½-cu.yd. capacity with 60-ft. radius, and other of ¾-yd. capacity, 35-ft. radius, for Kooweerup.

Manitoba Sugar Co., Ltd., Winnipeg, Man., plans new beet sugar mill near city, consisting of several one and multi-story units for main refinery and other structures for packing, storage and distribution; a power house, machine shop and other mechanical departments will be built. Cost about $1,750,000 with equipment.